#### FISCAL NOTE FOR PROPOSED PERMANENT RULES 15A NCAC 18E

#### WASTEWATER TREATMENT AND DISPOSAL SYSTEMS

Rules: 15A NCAC 18E (adoptions)

15A NCAC 18A Section .1900 (repeals)

Agency: NC Commission for Public Health

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Impact Summary: State Government: Yes

Local Government: Yes
Private Impact: Yes
Substantial Impact: Yes

Authority: N.C.G.S. Chapter 130A, Article 11; 130A-291.1; 130A-291.2;

N.C.G.S. Chapters 89C, 89E, 89F, 90A;

Session Laws 2013-413; 2014-120; 2015-147; 2019-151; 2019-215

Necessity: The rules governing on-site wastewater treatment systems have not been

updated as a complete package since 1990. The proposed rule changes reflect current knowledge and experience with on-site wastewater

treatment systems as well as address technical corrections and legislative

changes.

#### I. SUMMARY

The on-site wastewater treatment system rules (15A NCAC 18A .1900) have not been updated as a complete package since 1990. In the intervening 31 years, the industry has seen many technological advances, terminology has been standardized, and practical knowledge has been enhanced. The proposed rules incorporate current rule interpretations and existing knowledge of advanced technologies as well as previously excluded products and updated and simplified terminology, reflecting significant improvement in consistency and clarity.

Most of the proposed revisions to the rules are a re-organization of the current code and clarification of current language as part of an effort to simplify and streamline the rules. Interpretations that have been in place for many years have been clarified and the rules now better reflect the available options for technology, system design, data collection, operation, maintenance, monitoring, and overall management of on-site wastewater treatment systems.

## II. INTRODUCTION AND BACKGROUND

The On-Site Water Protection Branch (OSWP) of the NC Department of Health and Human Services (NCDHHS), Division of Public Health (DPH), Environmental Health Section, oversees the sewage treatment and dispersal rules for on-site wastewater treatment systems. The program is a joint effort among the local health departments (LHDs) and OSWP. OSWP provides statewide regulatory and rincluding developers, builders, land-owners, system installation contractors, certified subsurface operators, professional engineers (PEs), licensed soil scientists (LSSs), professional geologists, environmental health consultants, and others.

On-site wastewater treatment and dispersal systems serve property owners in rural parts of the state and areas not served by a centralized (regional or municipal) wastewater treatment system. Approximately 50% of the homes in North Carolina rely on soil-based on-site wastewater treatment systems and that dependence within our state has remained relatively constant for more than 25 years. These systems are an effective, critical, and permanent component of our wastewater treatment infrastructure.

The primary goal of on-site wastewater treatment systems is the protection of public health and the environment. Wastewater contains bacteria, pathogens, and other contaminants that can have a significant impact on people and their surroundings. If treatment and dispersal is inadequate, for example, a stomach virus from one person can be transmitted through the soil to a drinking water supply and potentially infect others or excess nitrogen discharged to the surface waters can create algal blooms that can kill fish populations by depleting oxygen levels. The rules contain provisions that ensure on-site wastewater treatment systems are properly sited to avoid these public health and environmental concerns.

Ultimately, water follows a specific cycle: the homeowner discharges wastewater down the drain into an on-site wastewater treatment system; the effluent from the treatment system is eventually dispersed into the soil (where it receives final treatment) and then to the groundwater; the groundwater flows to a stream; the stream flows to a water treatment plant; the water treatment plant conveys drinking water to its customers; and the homeowner discharges wastewater down the drain.

Over time, fewer people have contracted illnesses due to inadequate on-site wastewater treatment system discharges. A significant reason for the sustained reduction of illness over the past 40 years is vigilant enforcement of these rules by LHDs and OSWP. As a result, the importance of on-site wastewater treatment system rules has sometimes been forgotten or minimized. People instead tend to focus more on economic development and maximizing buildable lots and less on the potential public health and environmental effect of improper wastewater management.

A study published by Nicholas DeFelice<sup>1</sup>, et al, in Environmental Health Perspectives estimated the partial per-incident cost of human illness from microbial contamination of drinking water, which can result from wastewater treatment system malfunctions. The study looked at 122 North Carolina emergency departments and found that from 2007-2013, 29,400 visits for acute gastrointestinal illnesses (diarrhea, vomiting, fever, or abdominal cramps) could be attributed to private drinking water well contamination.

The average treatment cost per emergency room visit in 2013 was \$1,357. While it is not possible to determine what proportion of the waterborne illness incidents were caused by wastewater treatment system malfunctions, this study provides a per-incident cost of the illness. This is an underestimate

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<sup>&</sup>lt;sup>1</sup> DeFelice, N. B., Johnston, J. E., MacDonald Gibson, J. (2016, May 20) "Reducing Emergency Department Visits for Acute Gastrointestinal Illnesses in North Carolina by Extending Community Water Service". http://www.ehponline.org

because it does not capture gastrointestinal illnesses treated in other care settings, or secondary effects, such as lost work-days. It also does not capture any environmental effects attributable to microbial contamination.

# II. RULE DEVELOPMENT PROCESS

The on-site wastewater treatment system rules were first adopted in 1977 and the last major update was in 1990. Since then, sporadic changes have been made to the current rules resulting in inconsistent terminology and a certain amount of conceptual contradiction. In the late 1990's, OSWP began an effort to update the full set of current rules. Over a period of 10 years, a committee of public and private sector stakeholders reviewed the current rules and proposed language, but the formal rulemaking process did not start for multiple reasons.

The current rulemaking effort began with the distribution of the draft rules from the *previous* effort in the late 1990's to major stakeholder groups (LHDs, product manufacturers, certified subsurface operators, installers, tank manufacturers, LSSs, PEs, North Carolina Septic Tank Association, and other interested parties). Representatives of these groups attended formal meetings in 2014 to provide updated input on the proposed rules. OSWP then distributed an updated (based on stakeholder comments) version of the proposed rules for review by the stakeholders a second time.

After going through the formal rulemaking process, including going out for public comment twice, the 15A NCAC 18E rules were adopted by the Commission for Public Health on August 8, 2018, and approved by the Rules Review Commission, in two parts, on October 18, 2018, and November 15, 2018. Subsequently, 42 of the 99 rules in 15A NCAC 18E received written objections requesting legislative review and, pursuant to G.S. 150B-21.3, were submitted to the legislature for review. The effective dates of the remaining rules were delayed, pending legislative review.

During the legislative session, Session Law 2019-151 was passed. This Session Law disapproved all 99 of the new on-site wastewater rules adopted by the Commission for Public Health in 15A NCAC 18E. It also established a Task Force charged with studying and issuing recommendations on the rules for consideration by the Commission for Public Health. The Task Force released its report on February 1, 2020. A brief overview of the Task Force report was presented to the Commission for Public Health at their February 5, 2020 meeting. The Commission for Public Health then formed a Committee for On-site Wastewater Rules to review the report in more detail and report back to the full Commission. The Committee voted to recommend that the Commission for Public Health accept the Task Force report and modify the draft 15A NCA 18E rules with the Task Force's recommendations. The Commission for Public Health accepted this recommendation at its May 6, 2020 meeting. The current rulemaking effort addresses the Task Force recommendations and other changes made by OSWP in response to stakeholder comments and additional review of the 15A NCAC 18E proposed rules and fiscal note.

#### III. PURPOSE OF RULE CHANGE

The long-term goal of the 15A NCAC 18E proposed rules is to continue to protect public health and the environment, while trying to give all homeowners the option to develop their piece of land. Not all lots are buildable, but the proposed rules continue to try and strike a balance between development and protection of public health and North Carolina's resources. To that end, the purpose of this rule revision is to:

- reorganize the rules into a more logical order to increase consistency and clarity;
- update and clarify rule language to address current practices;

- include previously excluded products and facilitate further innovation;
- update and standardize terminology using vetted sources; and
- align the rules with changes in law.

# Reorganize the Rules in a Logical Format

A key concern noted by stakeholders is the complicated organization of the current rules. Thus, as part of the proposed rules, OSWP is proposing to repeal the current rules, 15A NCAC 18A .1900, and adopt a new Subchapter, 15A NCAC 18E, for the on-site wastewater treatment system rules. This approach allows for a complete re-organization of the on-site wastewater treatment system rules in a logical order which will facilitate future rule revision significantly. This approach ensures that rules are internally consistent and provides end users with a more intuitive and logical structure.

# Update and Clarify Rule Language to Address Current Practices

Reorganizing the rules also provides the opportunity to clarify aspects of the rules that have generated questions in the past as well as update aspects of the rules that have diverged with current best practice.

## Facilitate Technological Innovation

In the past 31 years, numerous technological changes have occurred with on-site wastewater treatment systems. Based on current knowledge and experience, many individual home sites and larger tracts of land that would have been denied permits 31 years ago are now approved on a regular basis in North Carolina. The rules have not kept pace with the technology needed to facilitate these advances.

Precast reinforced concrete tanks are specifically listed in the current rules, but tanks made of other materials (such as polyethylene and fiberglass) are now commonly available but not addressed in rule. The proposed rules include all currently available tank construction materials (polyethylene, fiberglass, and precast reinforced concrete) and allow for other materials to be proposed for manufacture of tanks. The proposed rules also clearly identify the criteria that must be met by all tanks, regardless of the material used in tank construction.

The same approach held true for pumping systems, media filters, dispersal field trench technologies, drip irrigation technologies, appurtenances such as effluent filters, etc. The 15A NCAC 18E proposed rules will provide the broadest possible benefits from new emerging technologies to the end users of on-site wastewater treatment systems while continuing to protect public health and the environment.

## Standardize Terminology

Standard terminology is fundamental to good rules, especially in our unique industry. Piecemeal revisions adopted over the years included inconsistent terms and definitions. During the process, OSWP used terminology from nationally recognized resources to increase consistency at the state level but also encompass bigger picture issues.

## Align Rules with Changes in Law

Numerous Session Laws adopted over the past seven years have been issued that preempt aspects of the current rules in 15A NCAC 18A .1900. The new 15A NCAC 18E rules have been updated to align with these Session Laws.<sup>2</sup>

In summary, 15A NCAC 18A .1900 is being repealed and 15A NCAC 18E is being adopted to replace it in order to update, clarify, and align the state's on-site wastewater rules with current practice and law,

<sup>&</sup>lt;sup>2</sup> S.L. 2013-413, Section 34; S.L. 2014-120, Sections 47 and 53; S.L. 2015-147, Sections 1, 2, and 3; S.L. 2019-151, Sections 13 and 14; and S.L. 2019-215, Section 2.

facilitate innovation, standardize terminology, and improve organization and consistency of application across the state. The full text of the proposed rules are found in Appendices B and C.

#### IV. ECONOMIC IMPACT SUMMARY

Overall, the proposed rules facilitate the ability of the LHDs and OSWP to maintain and enhance protection of public health and the environment while providing property owners broader options and the private sector clear and well-defined benchmarks. The impact of the quantified 15A NCAC 18E rule changes is estimated at a net cost of \$3.4 million over the first four years. A portion of this net cost is already incurred under current practices that are now being codified in rule. In addition, several significant changes have unquantifiable benefits. The Division expects the unquantifiable benefits of the proposed rules to exceed these quantified costs.

Overall, the largest financial impact of the revised 15A NCAC 18E rules will still be on the private sector, the owner (facility owner) and product manufacturers. A certain percentage of the costs incurred by product manufacturers will be passed on to the owner, who, in turn, receives a higher quality system component. Certified subsurface operators will see an increase in the number of systems they may contract to inspect, increasing their bottom line but also protecting the property owner's investment through regular maintenance. Third party certification and verification companies will also see an increase in benefits from required testing, monitoring, and reporting.

The costs associated with plastic and fiberglass tank approvals, and effluent filters, risers, and pipe penetration approvals are included in the proposed rules and this fiscal note. However, these policies are an established part of the approval process for proprietary products and manufacturers are already incurring these costs.

Some of the most significant changes in the proposed rules have an unquantified fiscal impact. These include the ability to develop lots that would previously have been denied permits based upon their design daily flow and the soil and site conditions on the property. Rule revisions include updated requirements for design daily flow and siting criteria when advanced pretreatment is used. Further, manufacturers will have clear targets that must be achieved to gain approval for use of their advanced pretreatment product in North Carolina. The requirements for when a PE is required to design an on-site wastewater treatment system have also been expanded.

The main overarching benefit from the proposed rules are the changes that continue to protect public health and the environment, based on current knowledge and experience with on-site wastewater treatment systems. The requirement to include advanced pretreatment components to treat high strength (stronger than domestic) wastewater is an unquantifiable cost to the owner. But the benefits to everyone, owner included, are also unquantifiable. Many positive changes that are unquantifiable have also been made for the benefit of owners and the manufacturers: clearer targets for submittals, expanded lists of wastewater flows, and more.

Fees are collected by OSWP for review of wastewater systems and components. These fees are identified in G.S. 130A-343(k) and will not change with these rules.

The increase in cost to implement 15A NCAC 18A from the fiscal note approved in August 2018 reflect the changes made to align the rules with the legislative Task Force recommendations.

Table 1 summarizes the costs and benefits of the proposed 15A NCAC 18E rules projected for the first four years.

Table 1. Benefits and Costs Summary, Including Net Present Value

BENEFITS	2021	2022	2023	2024
State Gov't, OSWP				
Wastewater flow reduction from expanded facility list	Unquantified			
Local Gov't, LHDs				
Existing system inspection fees	\$48,800	\$48,500	\$48,000	\$47,500
Wastewater flow reduction from expanded facility list	Unquantified			
Engineer design of systems >600gal/day with pressure manifold	Unquantified			
Facility Owner				
AOWE designs	\$740,139	\$740,139	\$740,139	\$740,139
Longer system life, avoidance of repair costs	Unquantified			
Earlier identification of malfunctions	Unquantified			
Increase the design flow of Advanced Pretreatment systems	Unquantified			
Wastewater flow reduction from expanded facility list	Unquantified			
Passed-on Manufacturer Benefits	Unquantified			
Manufacturer				
Piggyback control panel revenue	\$870,688	\$890,880	\$906,098	\$924,345
Grease Tank Capacity Increase revenue	\$270,122	\$278,226	\$286,573	\$295,170
Accepted systems status survey	Unquantified			
Simplified, more flexible approval process for new technologies	Unquantified			
Increase the design flow of Advanced Pretreatment systems	Unquantified			
Drip dispersal system approval criteria	Unquantified			
Wastewater strength requirement for advanced pretreatment	Unquantified			
Private Certifiers, Testers, Inspectors, and Consultants				
Type IIIb and Type IIIh Inspections	\$4,935,975	\$4,973,400	\$5,010,405	\$5,047,035
*Plastic and Fiberglass Tank Approvals	\$68,100	\$76,200	\$84,300	\$92,400
Structural Verification Test	\$36,600	\$36,600	\$36,600	\$36,600
*Risers, filters, and pipe penetrations approvals	\$10,000	\$10,000	\$10,000	\$10,000
Engineer design of systems >600gal/day with pressure manifold	Unquantified			
AOWE designs	\$425,661	\$425,661	\$425,661	\$425,661
All Parties and General Public				
Fewer system malfunctions	Unquantified			
(Human health, environmental, and business benefits)	Onquanuned			
<b>Total Benefits</b>	\$7,406,085	\$7,479,606	\$7,547,776	\$7,618,850

Total Costs	\$8,383,724	\$8,480,568	\$8,567,050	\$8,657,43
RWTS and P&I Renewals	\$33,300	\$33,300	\$33,300	\$33,30
Risers, filters, and pipe penetrations renewals	\$6,900	\$7,200	\$7,500	\$7,80
*Risers, filters, and pipe penetrations approvals	\$10,650	\$10,650	\$10,650	\$10,6
Concrete Tank Design Change	\$875,688	\$890,010	\$899,392	\$909,7
Structural Verification Test	\$36,600	\$36,600	\$36,600	\$36,6
*Plastic and Fiberglass Tank Approvals	\$106,200	\$122,400	\$138,600	\$154,8
Manufacturer				
AOWE designs	\$1,165,800	\$1,165,800	\$1,165,800	\$1,165,8
Engineer	•			
Passed-on Manufacturing Costs	Unquantified			
Wastewater strength requirement for advanced pretreatment	Unquantified			
Additional tank required with grinder pumps	Unquantified			
Engineer design of systems >600gal/day with pressure manifold	Unquantified	T	, , - · · ·	, ->c,
Grease Tank Capacity Increase	\$270,122	\$278,226	\$286,573	\$295,
Piggyback control panels	\$870,688	\$890,880	\$906,098	\$924,
Type IIIb and Type IIIh Inspections Fees	\$4,935,975	\$4,973,400	\$5,010,405	\$5,047,
Existing system inspections fees	\$48,800	\$48,500	\$48,000	\$47,
Facility Owner	Onquantinea			
Structural verification test - stronger enforcement	Unquantified	Ψ12,500	Ψ17,733	Ψ20,
Existing system inspection time	\$19,130	\$19,580	\$19,955	\$20,3
Local Gov't, LHDs	φ1,901	\$1,936	\$2,010	Ψ2,
Risers, filters, and pipe penetrations renewals time RWTS and P&I Renewals Time	\$1,901	\$1,958	\$2,016	\$2,
*Risers, filters, and pipe penetrations approvals time	\$138 \$795	\$142 \$854	\$147 \$916	\$ \$!
*Plastic and Fiberglass Tank Approval Time	\$1,037	\$1,068	\$1,100	\$1,
State Gov't, OSWP	¢1 027	¢1.060	¢1 100	<b>0.1</b>
OSTS	2021	2022	2023	20

or benefits.

NET QUANTIFIED IMPACT - Excludes unquantified costs and benefits	2021	2022	2023	2024
State Gov't	(\$3,871)	(\$4,022)	(\$4,178)	(\$4,337)
Local Gov't	\$29,670	\$28,920	\$28,045	\$27,182
Facility Owner	(\$6,125,585)	(\$6,191,006)	(\$6,251,076)	(\$6,314,050)
Manufacturer	\$71,472	\$68,946	\$66,629	\$66,586
Private Certifiers, Testers, and Inspectors	\$5,050,675	\$5,096,200	\$5,141,305	\$5,186,035
General Public				
Net Impact	(\$977,638)	(\$1,000,962)	(\$1,019,275)	(\$1,038,583)
NPV, 2020\$	(\$3,412,322)			

#### V. ANALYSIS

To determine the fiscal impact of the proposed rules, information was collected from LHDs, OSWP staff, PEs, LSSs, and installers. LHDs were categorized into three groups based upon the number of authorized agents on staff (small LHDs: one or two; mid-size LHDs: three to four; large LHDs: five or more) that permit on-site wastewater treatment systems. The size of the LHD impacts the services offered, on-site wastewater treatment system permits issued, and the fees charged.<sup>3</sup> The smaller LHDs are generally in rural counties, and the larger LHDs are in more urban counties. LHDs from the three physiographic regions (mountains, piedmont, and coastal plain) were identified to capture fiscal impacts across the full range of soil conditions (and thus, system types) seen in the State. The permit projections are included in Appendix A.

The analysis of the proposed rules is broken down into four categories, depending on how different the requirements are from current requirements in 15A NCAC 18A Section .1900:

- I. Rules with minor changes or technical corrections;
- II. Rules clarified to reflect current practices;
- III. Rules with a quantifiable fiscal impact; and
- IV. Rules with an unquantifiable fiscal impact.

## I. Rules with minor changes or technical corrections

The majority of proposed revisions constitute minor changes or technical corrections that ensure consistency across all the rules. These rules do not represent a change in intent, nor do they pose any additional fiscal impact on industry, State government, or local governments. Although these rules are proposed as new rules, they will replace rules that will be repealed. Sixty-one rules fall into this category and include the following:

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Section .0100 - General
   15A NCAC 18E .0101 - Scope
   15A NCAC 18E .0102 – Applicability
   15A NCAC 18E .0103 – Incorporation by Reference
   15A NCAC 18E .0104 – Abbreviations
   15A NCAC 18E .0105 - Definitions
Section .0200 – Permits
   15A NCAC 18E .0201 - General
   15A NCAC 18E .0202 – Application
   15A NCAC 18E .0203 – Improvement Permit
   15A NCAC 18E .0204 – Construction Authorization
   15A NCAC 18E .0205 – Operation Permit
Section .0300 – Responsibilities
   15A NCAC 18E .0301 – Owners
   15A NCAC 18E .0302 – Local Health Department and State
   15A NCAC 18E .0304 - Submittal Requirements for Plans, Specifications, and Reports Prepared
           by Licensed Professionals for Systems Over 3,000 Gallons/Day
   15A NCAC 18E .0305 - Submittal Requirements for Plans, Specifications, and Reports Prepared
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Section .0500 – Soil and Site Evaluation

by Licensed Professionals for Systems Less Than or Equal to 3,000 Gallons/Day

<sup>&</sup>lt;sup>3</sup> LHDs may impose fees in accordance with G.S. 130A-39(g).

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15A NCAC 18E .0501 - Site Evaluation
   15A NCAC 18E .0502 – Topography and Landscape Position
   15A NCAC 18E .0503 – Soil Morphology
   15A NCAC 18E .0504 – Soil Wetness Conditions
   15A NCAC 18E .0505 – Soil Depth to Rock, Saprolite, or Parent Material
   15A NCAC 18E .0506 - Saprolite
   15A NCAC 18E .0507 - Restrictive Horizons
   15A NCAC 18E .0509 – Site Suitability and Classification
   15A NCAC 18E .0510 – Special Site Evaluations
Section .0600 – Location of Wastewater Systems
   15A NCAC 18E .0602 – Applicability of Setbacks
Section .0700 – Collection Sewers, Raw Sewage Lift Stations, and Pipe Materials
    15A NCAC 18E .0701 – Collection Sewers
   15A NCAC 18E .0702 - Raw Sewage Lift Stations
   15A NCAC 18E .0703 – Pipe Materials
Section .0800 - Tank Capacity, Leak Testing, and Installation Requirements
    15A NCAC 18E .0801 – Septic Tank Capacity Requirements
   15A NCAC 18E .0802 – Pump Tank Capacity Requirements
   15A NCAC 18E .0804 – Siphon Tank Capacity Requirements
   15A NCAC 18E .0805 – Tank Leak Testing and Installation Requirements
Section .0900 – Subsurface Disposal
   15A NCAC 18E .0901 - General Design and Installation Criteria for Subsurface Dispersal
           Systems
   15A NCAC 18E .0902 – Conventional Wastewater Systems
   15A NCAC 18E .0903 – Bed Systems
   15A NCAC 18E .0904 – Large Diameter Pipe Systems
   15A NCAC 18E .0905 – Prefabricated Permeable Block Panel Systems
   15A NCAC 18E .0906 – Sand Lined Trench Systems
   15A NCAC 18E .0907 – Low Pressure Pipe Systems
   15A NCAC 18E .0909 – Fill Systems
   15A NCAC 18E .0910 - Artificial Drainage Systems
   15A NCAC 18E .0911 – Privies
Section .1000 – Non-Ground Absorption Systems
    15A NCAC 18E .1001 - Alternative Toilets
Section .1100 – System Dosing and Controls
   15A NCAC 18E .1101 – General Dosing System Requirements
   15A NCAC 18E .1102 – Pump Dosing
   15A NCAC 18E .1104 – Siphon Dosing
   15A NCAC 18E .1105 – Timed Dosing
   15A NCAC 18E .1106 – Pressure Dosed Gravity Distribution Devices
Section .1200 – Advanced Pretreatment Systems Standards, Siting, and Sizing Criteria
    15A NCAC 18E .1205 - Advanced Pretreatment Sand Lined Trench Systems
   15A NCAC 18E .1206 – Advanced Pretreatment Bed Systems
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Section .1300 – Operation and Maintenance

15A NCAC 18E .1302 – Operation and Maintenance of Advanced Pretreatment Systems

15A NCAC 18E .1303 – Owner Responsibilities for Wastewater System Operation and Maintenance

15A NCAC 18E .1304 – Management Entity Responsibilities for Wastewater System Operation and Maintenance

15A NCAC 18E .1305 – Local Health Department Responsibilities for Wastewater System Operation and Maintenance

15A NCAC 18E .1306 - System Malfunction and Repair

15A NCAC 18E .1307 – Wastewater System Abandonment

## Section .1400 – Approval of Tanks and Appurtenances

15A NCAC 18E .1402 – Tank Design and Construction

15A NCAC 18E .1406 – Modification, Suspension, and Revocation of Approvals

Section .1500 – Approval and Use of Residential Wastewater Treatment Systems

15A NCAC 18E .1501 – General

15A NCAC 18E .1502 – Application

15A NCAC 18E .1503 – Design and Construction Standards

15A NCAC 18E .1504 – Sampling Requirements for Residential Wastewater Treatment Systems

## II. Rules clarified to reflect current practices

In the past, questions have arisen based on the rule language and what that language means exactly. As part of the rule revision, the language has been clarified to reflect the current knowledge base and accepted best practices. Four rules fall into this category:

15A NCAC 18E .0508 – Available Space

15A NCAC 18E .0901 – Conventional Wastewater Systems

15A NCAC 18E .1302 – Operation and Maintenance of Advanced Pretreatment Systems

15A NCAC 18E .1710 – Compliance Criteria for Advanced Pretreatment Systems

Rule 15A NCAC 18E .0508 – Available Space

The current 15A NCAC 18A .1900 rule requires repair area for all new on-site wastewater treatment systems permitted. The only exception allowed is for lots or tracts of land that are described in a recorded deed or a recorded plat on or before January 1, 1983. The on-site wastewater treatment system design daily flow shall be less than or equal to 480 gallons/day for the lot or tract of land to receive this exemption.

When a facility is expanded, such as a house adding a bedroom, the on-site wastewater treatment system must also be expanded for the additional wastewater flow and the repair area must be expanded to account for the additional flow. On a repair exempt lot, when an on-site wastewater treatment system is proposed to be expanded, area to expand the wastewater system must be found. Whether or not repair area needs to be found for the additional flow has been interpreted in two different ways by the LHDs. If the design daily flow does not exceed 480 gallons/day, some LHDs do not require repair area to be found for the additional flow. Other LHDs have specified that the exemption for the repair area was given to the original house, and any expansion is required to have repair area.

The proposed rule clarifies that no repair area is required on repair exempt lots that are proposing to expand if certain requirements are met, such as the expanded design daily flow does not exceed 480 gallons/day, there is sufficient suitable area for the on-site wastewater treatment system to be expanded, etc.

Rule 15A NCAC 18E .0901 – General Design and Installation Criteria for Subsurface Dispersal Systems

The current on-site wastewater treatment system rules require 12 inches of separation between the trench bottom and a limiting soil condition, and as much as 18 inches of separation between the trench bottom and any soil wetness condition in sandy soils (Group I soils). This vertical separation distance is based on peer reviewed research on the minimum soil depth required to protect public health and the environment. The total soil depth required on a site to issue an on-site wastewater treatment system permit has been interpreted differently over time.

For conventional gravel dispersal fields, at least 24 inches of approvable soil below the ground surface is required based upon 12 inches of gravel in the trench and 12 inches of vertical separation to a limiting condition. Other trench products that measure less than 12 inches in height have still been required to have 24 inches of approvable soil on the site. Some past interpretations of the current rules have determined that if a trench height for a proprietary product is 10 inches, only 22 inches of approvable soil is required on the site (12 inches of vertical separation and 10 inches proprietary product height).

The proposed rule change would specify that a 12-inch separation is required for all trench products, except where an 18-inch separation is needed in Group I soils. This would allow all trench products and dispersal systems to be treated equally. The on-site wastewater treatment system design will be dictated by the soil conditions and site features, not the current rule interpretation.

Because this rule change is merely a clarification of the current rules and how this specific requirement has been applied, there is no cost to OSWP or LHDs. This would affect homeowners positively as it would allow them a broader range of options from which to choose when selecting a trench product/dispersal system. Product manufacturers would also see a positive impact from this rule clarification if their product is applicable to more sites and preferred by consumers. Conversely, manufacturers may incur a cost if consumer preferences shift away from their product to a newly applicable product.

Rule 15A NCAC 18E .1302 – Operation and Maintenance of Advanced Pretreatment Systems Rule 15A NCAC 18E .1710 – Compliance Criteria for Advanced Pretreatment Systems

The current rules provide effluent compliance criteria for performance of advanced pretreatment systems. These criteria include evaluation of effluent sampling results from an advanced pretreatment system to determine whether the sample results meet effluent treatment standards. Evaluation of sampling results determines compliance for:

- initial product approval pursuant to G.S. 130A-343;
- continued product approval or advancement from Provisional to Innovative status; and
- individual site compliance.

The effluent compliance criteria in the current rules applies to a single *site* (such as a single-family home or a business) where advanced pretreatment is used as well as to the *product* approval (all advanced pretreatment systems installed under a given product Provisional and Innovative (P&I) approval).

Use of advanced pretreatment allows OSWP and the LHDs to grant siting concessions (such as decreased horizontal or vertical setbacks or an increase in the soil loading rate) based upon dispersing a higher quality wastewater effluent to the dispersal field. These may result in a slight increased potential risk to public health and the environment, so effluent from these systems is sampled on a regular basis to verify that the system meets the specified parameters.

For most single-family homes, effluent samples are collected once per year. Using the current criteria, if sample results for a single parameter are out of compliance, the site could be deemed out of compliance. Many simple things can cause an effluent sample to be out of compliance, such as a clump of solids in the effluent sample, excessive sample holding time, or improper sampling technique. When a sample result is out of compliance, the protocol includes provisions for resampling (at an additional cost to the owner) to demonstrate compliance.

OSWP engaged in an internal exercise to apply the current criteria to evaluate the performance of an advanced pretreatment system for a product P&I approval. In doing so, OSWP demonstrated clearly that the interpretation of the criteria is not being consistently applied. Currently approved advanced pretreatment systems have difficulty meeting the requirements due in part to these differing interpretations of the current rules. The proposed rules reflect review of real-world data from approved advanced pretreatment systems in North Carolina and will standardize criteria for compliance determination for both an individual site and a specific system P&I approval regardless of who conducts the evaluation. The modified compliance criteria still protect public health and the environment. OSWP may revoke a small number of existing products based on the proposed rules, however, this is expected to be an infrequent occurrence.

The compliance standards for advanced pretreatment systems have also been expanded to be used for new applications for P&I approval. This allows all advanced pretreatment systems to be evaluated based on the same criteria. Advanced pretreatment manufacturers will have a clearer target for showing that their product complies with the rules. OSWP will also be better able to identify advanced pretreatment systems that are out of compliance through consistent evaluation of data.

#### III. Rules with a quantifiable fiscal impact

The following eleven rules have a quantifiable fiscal impact:

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15A NCAC 18E .0206 – Existing System Approvals for Reconnections and Property Additions
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15A NCAC 18E .0207 – Alternative Wastewater System Permitting Options

15A NCAC 18E .0803 – Grease Tank Capacity Requirements (included with .1400 Rules in discussion)

15A NCAC 18E .1103 - Control Panels

15A NCAC 18E .1301 – Operation and Maintenance of Wastewater Systems

15A NCAC 18E .1401 – Plans for Prefabricated Tanks

15A NCAC 18E .1403 – Tank Material Requirements

15A NCAC 18E .1404 – Plans for Risers, Effluent Filters, and Pipe Penetrations

15A NCAC 18E .1405 – Risers, Effluent Filters, and Pipe Penetration Approval Renewal

15A NCAC 18E .1505 – Residential Wastewater Treatment System Approval Renewal

15A NCAC 18E .1711 – Provisional and Innovative Approval Renewal

Rule 15A NCAC 18E .0206 – Existing System Approvals for Reconnections and Property Additions

When a new structure, such as a deck, shed, swimming pool, etc., is built on a piece of property with an existing house and on-site wastewater treatment system, that new structure must meet the minimum horizontal setback requirements to the on-site wastewater treatment system and repair area. Many times, structures are built without confirmation that their proposed location meets these minimum horizontal setbacks, and construction may even occur directly over the system or repair area. These problems may not be revealed until the property is conveyed to a new owner or when the on-site wastewater system malfunctions. At that point, solutions may be limited. The existing system may be compromised beyond repair, or the repair area may have been compromised by construction and thus, no longer available. If no additional land is available, the property owner may have no options at all aside of permanent pump and haul.

To prevent these problems, the owner must apply to the LHD prior to the owner beginning construction to ensure that the on-site wastewater treatment system is not affected. The LHD can confirm that the location of the new structure meets setbacks to the on-site wastewater treatment system and provide written confirmation to the county Building Inspections department prior to the release of the building permit. In the event that modifications to the on-site wastewater treatment system would allow the owner to proceed with proposed construction, the LHD can issue the appropriate permits.

The majority (approximately 95%) of LHDs already provide this service to their customers.<sup>4</sup> This service evolved over time without guidance from OSWP, because the LHDs were seeing many on-site wastewater treatment system malfunctions associated with structures placed or built on the on-site wastewater treatment system.

This rule helps clarify the minimum requirements and the process an owner and the LHD must follow in these situations. LHDs that already confirm new structure building permits may choose to modify their current procedures based on the proposed rule. The costs of these modifications are unquantifiable. Tables 2 and 3 show the projected costs to the private sector and the 5% of LHDs that will have to implement new processes for existing system inspections.

These proposals will also prevent delays in real estate transactions resulting from discovery of improperly located structures. If the existing on-site wastewater treatment system is under a structure, swimming pool, or deck, for example, the transaction could be delayed while the buyers and sellers negotiate how the on-site wastewater treatment system issues will be addressed. A problem with the on-site wastewater treatment system may terminate the transaction completely. The integrity of the wastewater system is central to the long-term value of the residence or structure itself.

With these rule revisions in place, appropriate setbacks will be maintained to protect the integrity of the on-site wastewater treatment system. Existing system inspections will have ongoing impacts. LHDs that do not have a program will incur costs to implement one and ongoing costs to maintain the program. The total number of existing system inspections performed by LHDs on an annual basis will vary, as it is based on the owner's decision to build additional structures on their lot. Table 4 summarizes the benefits associated with existing system inspections.

Table 2. Projected Cost Increases and Losses to LHDs for Existing System Inspections, Year One\*

Local Health Department Projected Cost Increases	
Average Number of Existing System Inspections	488
Average Application Fees Collected	\$100
Total Benefits in Fees Collected	\$48,800
Total Cost in Man Hours for Existing System Inspections (Number of Existing System Inspections x 1.0 man hours x Hourly Compensation**)	(\$19,130)
Net Savings	\$29,670

<sup>\*</sup>Values are presented in 2021 dollars.

\*\*Calculated based on 2016 government salary information for REHS from NCOSHR and projected growth in NC state and local government wages from IHS Markit, and cost of employee benefits by industry from the US Bureau of Labor Statistics. The mid-range hourly wage rate, including benefits, is expected to be \$39.20 in 2021.

<sup>&</sup>lt;sup>4</sup> Estimate based on consultation with LHD accreditation evaluator.

Table 3. Private Sector Costs Associated with Existing System Inspections, Year One\*

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Private Sector Projected Cost Increases	
Average Number of Existing System Inspections	488
Average Application Fee Paid to LHD	\$100
Total Cost to Private Sector (Number of Existing Systems Inspected x Application Fee)	\$48,800
Net Savings (Cost)	\$48,800

<sup>\*</sup>Values are presented in 2021 dollars.

Table 4. Summary of Benefits from Existing System Inspections

# Private Sector Benefits (homeowner, consultants, operators, installers)

Ensures verification of location of existing on-site wastewater treatment system relative to proposed new construction

Maintains appropriate setbacks to on-site wastewater treatment system to protect system integrity Reduces number of on-site wastewater treatment system malfunctions

Precludes costs to repair malfunctioning on-site wastewater treatment systems

Improves ability to sell house or business in the future

Protects property owner's investment

# **Public Sector Benefits (LHD and OSWP)**

Fewer wastewater system malfunctions

Additional service to provide to their clients

#### Rule 15A NCAC 18E .0207 – Alternative Wastewater System Permitting Options

In the summer of 2016, the Engineered Option Permit (EOP) became available. The EOP allows a PE in the private sector to write a permit for an on-site wastewater treatment system. The LHD is not involved in the permitting process except to verify that the submittal has all required information and to maintain the files. No technical review for compliance with the laws and rules is done by the LHD.

In the four years that the EOP has been available, almost 2,200 EOPs have been submitted to the LHDs. Of those 2,200, 90% have a design daily flow of 480 gallons/day or less. If permitted by the LHD, none of these systems would be required to be designed by a PE. Due to this trend, legislation was passed that allows an LSS to obtain a certification that will allow the LSS to also design and inspect on-site wastewater systems. The certification allows the LSS to become an authorized on-site wastewater evaluator (AOWE). The AOWE can also permit on-site wastewater treatment systems without LHD involvement.

Since the trend of the EOPs has been towards smaller systems that would not otherwise require engineered design, the AOWE permitting option provides homeowners with another private permitting option that is less expensive than an EOP.

The percentage of EOPs written remains about 3% of the total number of permits issued for on-site wastewater treatment systems.

Session Law 2020-3, Section 4.18, included a provision to allow LSS's to issue permits for on-site wastewater treatment systems to help with the backlog at LHDs due to the COVID-19 pandemic. The

Session Law became effective May 4, 2020 and expired August 1, 2020. Session Law 2020-97, Section 3.19, resurrected the provision that allows LSS's to issue permits for on-site wastewater treatment systems during the COVID-19 pandemic. So far, over 400 LSS COVID-19 permits have been submitted to the LHDs.

LHDs should not see a significant change once the AOWE option is available. The AOWE permitting process is almost identical to the EOP process, so the LHDs will already have the procedures in place to handle the AOWE permits. What will change is that a certain number of EOPs will now be submitted as AOWE permits. Based on the number of EOP permits issued in 2020 from May through November and the number of LSS COVID-19 permits issued in 2020 from May through November, OSWP estimates approximately 55% of EOP permits will now be issued as AOWE permits. Nearly all the permits that will be issued by AOWEs instead of PEs are likely to be smaller systems, 480 gallons/day or less.

The biggest impact will be to the owners. Their costs will be reduced as they will not be paying a PE in addition to the LSS and installer. Table 5 shows the costs to the homeowner for the AOWE permit option. Table 6 summarizes the benefits associated with the AOWE permit option.

Table 5. Private Sector Costs Associated with On-Site Wastewater Treatment Systems Permitted Under the EOP, 2020 dollars\*

the EOP, 2020 dollars*				
<b>Private Sector Projected</b>	Private Sector Projected Costs and Benefits			
System Description	360 gallons/day Conventional System (septic tank to gravity dispersal field)	480 gallons/day TS- II Advanced Pretreatment System with Drip Irrigation	2,000 gallons/day Conventional System (septic tank, pump tank, dispersal field)	
Current Proportion of EOP Permitted Systems	85%	5%	10%	
Average Cost to the Homeowner Permitted under EOP	\$3,050	\$5,900	\$7,750	
Average Cost to the Homeowner Permitted under AOWE	\$1,034	\$3,550	\$2,067	
Cost Difference Between EOP and AOWE	\$2,016	\$2,350	\$5,683	
Proposed Proportion of EOP Permitted Systems Converted to AOWE	60%	60%	1%	
Total Permits Converted to AOWE	341	20	1	
Annual Savings to Homeowner	\$687,456	\$47,000	\$5,683	
EOP Revenue Loss	\$1,040,050	\$118,000	\$7,750	
AOWE Revenue Benefit	\$352,594	\$71,000	\$2,067	

<sup>\*</sup>All costs include the following: AOWE/PE and construction administration. Installation cost is not included and should be the same for both options.

Table 6. Summary of Benefits from AOWE Permit Option

Private Sector Benefits (homeowner, consultants, operators, installers)

Provides owners with another permitting option to reduce project delays due to LHD backlogs. An AOWE designed permit is typically lower cost than a PE designed permit.

Increased revenue for AOWEs and allows AOWEs to provide their clients with an expanded range of services (a revenue loss for PEs)

# **Public Sector Benefits (LHD and OSWP)**

Allows LHDs to give customers another permitting option if there is a backlog

#### Rule 15A NCAC 18E .1103 - Control Panels

The current rules allow for the use of piggyback controls. The piggyback control is an outdoor electrical outlet with a cover into which the pump is plugged. Piggyback controls have limited functionality aside from turning the pump on and off. It is estimated that over 30,000 on-site wastewater treatment systems use piggyback controls.

Problems associated with piggyback controls include: safety issues when used in a wet environment; cords exposed and subject to deterioration by sunlight or damage during yard maintenance; accessibility (sometimes piggybacks are installed at a very low elevation, at or near the ground surface); alarms not readily visible (device located in a crawl space under the house, in the garage, or an outdoor closet, etc.); corrosion issues; and limited space inside the piggyback control receptacle to house all the wiring and the plug.

The 15A NCAC 18E rules propose to require control panels for all pump systems. Control panels provide many improvements over the piggyback controls. Control panels are NEMA 4X rated, meaning that the enclosure is resistant to water intrusion into the panel and subsequent corrosion. Control panels are larger than an outdoor electrical outlet, allowing for more room for certified subsurface operators to perform work within the enclosure. The visible and audible alarm components are a physical part of the control panel. The certified subsurface operator or LHD can check control panel function when conducting an inspection and operate the pump directly from the panel.

Control panels also provide more precise control and monitoring of the amount of effluent dosed to the dispersal field. The control panel will have elapsed time meters to document the amount of time the pump runs and cycle counters to document the number of times a pump turns on. If the on-site wastewater treatment system malfunctions, the elapsed time meters and cycle counters can assist in diagnosing problems because they document pump operation. This information allows calculation of the volume of effluent pumped to the dispersal field. The pump controls can document excessive water use by the owner. Alternately, the information may help identify leaks that may allow 'extra' water (such as stormwater or groundwater) to infiltrate the system. Either of these conditions can result in malfunction due to hydraulic overload.

The addition of elapsed time meters and cycle counters will allow the certified subsurface operator and LHD to easily trouble shoot malfunctioning systems and provide a history of system operation that is currently non-existent. This will help all parties (operator, LHD, and owner) to maximize the system operation and identify problems before they become malfunctions.

Tables 7 and 8 identify the projected cost increases for the use of control panels in pump systems. The average number of pump systems installed for 2021 was calculated based on the responses from the LHD on the number of pump systems installed in their county over the course of a year and reviewing information from the county monthly activity reports. The western counties see a greater number of

pump systems than the central and eastern counties. Approximately 15% of the on-site wastewater treatment systems installed require a pump and control panel.

Table 7. Projected Cost Increases for use of Control Panels for Pump Systems, Year One\*

Facility Owner Projected Cost Increases	
Average Number of Pump Systems Installed	2,576
Average Cost Increase to Install a Control Panel in 2021**	\$338
Total Cost	(\$870,688)

<sup>\*</sup>Values are presented in 2021 dollars.

Table 8. Projected Benefits for use of Control Panels for Pump Systems, Year One\*

Manufacturer Projected Revenue Increases	
Average Number of Pump Systems Installed	2,576
Average Cost Increase to Install a Control Panel in 2021**	\$338
Total Benefits	\$870,688

<sup>\*</sup>Values are presented in 2021 dollars.

There is an initial cost for the control panel, but after that, there is no additional cost associated with the control panel. As the number of systems installed continues to increase, the number of pump systems using control panels will stay the same or increase with the number of systems. Table 9 shows the projected number of permits issued and the number with pump systems with control panels installed over a five-year period. Table 10 summarizes the benefits associated with using control panels for all pump systems.

Table 9. Projected Number of Permits Issued and Pump Systems with Control Panels

Year	Projected Number	Projected Number of Pump
	of Permits Issued	Systems with Control Panels
2021	17,176	2,576
2022	17,068	2,560
2023	16,871	2,531
2024	16,702	2,505

Table 10. Summary of Benefits from Control Panels

# **Private and Public Sector Benefits**

Increased safety

Ability to troubleshoot malfunctions when they do occur

Ability to identify problems before they result in a system malfunction

Ease of accessibility

Rule 15A NCAC 18E.1301 – Operation and Maintenance of Wastewater Systems

There are two issues addressed with the proposed revisions: the expansion of on-site wastewater treatment system classification types, and LHD compliance inspections of Type IIIb systems.

The on-site wastewater treatment system classifications for operation and maintenance in the current rules have not kept pace with the different systems approved by OSWP. As the on-site wastewater treatment

<sup>\*\*</sup>Assuming a 3% increase in cost per year.

<sup>\*\*</sup>Assuming a 3% increase in cost per year.

system increases in size or complexity, the system classification also increases along with the frequency of certified subsurface operator visits and LHD compliance inspections.

In the proposed rules, the list of on-site wastewater treatment system classifications has been expanded to address the range in technologies that have been approved. The system classifications are now described more broadly so that newly approved technologies will fit more readily into the proposed system classification table. The expanded list reflects the current status of on-site wastewater treatment system classifications for operation and maintenance. This makes it easier for LHDs, owners, certified subsurface operators, and consultants to determine the frequency of required certified subsurface operator inspection.

The LHDs are required under the current rules to inspect certain on-site wastewater treatment systems at specified frequencies. These systems include those with pumps (Type IIIb, IVa, and IVb), advanced pretreatment (Type V and VI), drip dispersal (Type V), or with a design daily flow greater than 3,000 gallons/day (Type V). The LHDs compliance inspections verify that the system is operating in compliance with its operation permit and that there is no malfunction.

Not all LHDs conduct compliance inspections. Budget and staff limitations require the LHDs to focus on new on-site wastewater treatment system permits, repair permits, and other limited priorities.

The proposed rules provide the LHDs with two options for compliance inspections required for certain Type III on-site wastewater treatment systems: LHD staff or allow the owner to contract with a private certified subsurface operator.

Owners of systems classified as Type IIIb (on-site wastewater treatment systems with a single pump) or IIIh (gravity groundwater lowering systems) are not required to contract with a private certified subsurface operator for operation and maintenance. However, they are required to have a five-year compliance inspection by the LHD.

As part of the proposed rules, at the LHD's discretion, the owner may engage a private certified subsurface operator to perform the five-year compliance inspection. By providing another option under which these inspections can be performed, there is a greater chance of finding malfunctioning on-site wastewater treatment systems and repairing them.

The LHDs will still be responsible for conducting compliance inspections on all Type IV, V, and VI systems.

Over time, the number of systems to be inspected will increase as more systems are installed. There will be times where, as city sewer expands and is installed, houses will be disconnected from on-site wastewater treatment systems and the number of systems to inspect will decrease, but this will not be a yearly occurrence. This will be very irregular and unpredictable.

It is uncertain how many LHDs will opt to allow owners to hire a private certified subsurface operator to inspect Type IIIb and IIIh systems. LHDs that are not currently conducting compliance inspections will not lose any money since they are currently not collecting any fees for this service. If the LHD has a compliance inspection program in place but elects to offer owners the option to go to the private sector, any staff time savings from this option will be offset by lost inspection fee revenue. Tables 11 and 12 below show the net costs to LHDs and facility owners if 50% of the LHDs allow owners to hire a certified subsurface operator, as well as the net savings for private owners. This is an upper-bounds estimate.

By having owners use a private certified subsurface operator to inspect the system, LHDs that have not been conducting compliance inspections will gain information on the on-site wastewater treatment system and learn about malfunctions that may have occurred for years without any action taken.

For owners who currently do not pay any fees for a LHD compliance inspection, this will be a new cost. Owners who already pay for a LHD compliance inspection could pay more if the LHD chooses to end their compliance inspection program and require certified subsurface operators to inspect the Type IIIb and IIIh systems. OSWP assumes that LHDs are currently optimizing their time according to task priority. Therefore, OSWP assumes that LHDs that currently perform these inspections will continue to do so (since they generate revenue, on net), and those LHDs that currently do not have sufficient staff time to conduct the inspections will authorize private certified subsurface operators to conduct the inspections.

Table 11. Projected Facility Owner Costs Based Upon Using a Certified Subsurface Operator for Type IIIb and IIIh Inspections, Year One\*

Facility Owner Projected Additional Costs for Private Inspection, Annualized**		
Average Number of Type IIIb and IIIh Systems Inspected per Year (329,065/5)	65,813	
Proportion of Total Inspections Completed by Private Inspectors	50%	
Average Fee for Certified Subsurface Operator to Inspect a Type IIIb or IIIh System \$150		
Total Costs to Facility Owner	(\$4,935,975)	

<sup>\*</sup>Values are presented in 2021 dollars.

Table 12. Projected Benefits to Private Certified Subsurface Operators, Year One\*

Certified Subsurface Operator Revenue Benefits, Annualized**		
Average Number of Type IIIb and IIIh Systems Inspected Per Year (329,065/5)	65,813	
Proportion of Total Inspections Completed by Private Inspectors	50%	
Average Fee by Certified Subsurface Operator to Inspect a Type IIIb or IIIh System \$150		
<b>Total Benefits to Certified Operator</b>	\$4,935,975	

<sup>\*</sup>Values are presented in 2021 dollars.

These will be ongoing impacts, dependent upon LHDs decision to allow owners to hire a certified subsurface operator as well as dependent upon the number of systems installed. Table 13 shows the projected number of Type IIIb and IIIh systems over a four-year period, assuming that Type IIIb and IIIh will account for 15% of all existing systems. Table 14 summarizes the benefits associated with the expansion of wastewater system classification types and a private sector option for Type IIIb and IIIh system inspections.

Table 13. Projected Number of Permitted Type IIIb and IIIh Systems to be Inspected

Year	Type IIIb and IIIh
	Systems
2021	329,065
2022	331,560
2023	334,027
2024	336,469

<sup>\*\*</sup>Inspections must occur every 5 years

<sup>\*\*</sup>Inspections must occur every 5 years

Table 14. Summary of Benefits from Expansion of Wastewater System Classification Types and Type IIIb and IIIh Inspections

## Private Sector Benefits (homeowner, consultants, operators, installers)

Additional service to provide to their clients

Precludes costs to repair malfunctioning on-site wastewater treatment system

# **Public Sector Benefits (LHD and OSWP)**

Fewer on-site wastewater treatment system malfunctions

Rule 15A NCAC 18E .0803 – Grease Tank Capacity Requirements

Rule 15A NCAC 18E .1401 – Plans for Prefabricated Tanks

Rule 15A NCAC 18E .1403 – Tank Material Requirements

Rule 15A NCAC 18E .1404 – Plans for Risers, Effluent Filters, and Pipe Penetrations

Rule 15A NCAC 18E .1405 – Risers, Effluent Filters, and Pipe Penetration Approval Renewal

Tanks are a component of every on-site wastewater treatment system installed in North Carolina. All on-site wastewater treatment systems use a septic tank. Grease tanks are used with on-site wastewater treatment systems that are designed for food service establishments or other facilities expected to have significant amounts of fats, oil, and grease in their waste stream. Pump tanks are used when the effluent from the septic tank cannot flow by gravity to the dispersal field, the total dispersal field line length exceeds 750 linear feet, or the design daily flow is greater than 3,000 gallons/day.

## Grease Tank Capacity Requirement

Greases tanks are used to separate and remove the grease from wastewater generated by food service facilities. The disinfection methods used in commercial kitchen dishwashers (chemicals and high water temperature) keep the grease in suspension in the wastewater for a much longer period of time than typically occurs in a household kitchen. The wastewater needs sufficient time to cool so that the grease can congeal in the grease tank, so grease tanks generally need longer retention times than septic tanks. One way to increase retention time is to add additional tank compartments or tanks in series to the current grease tank size.

Removing the grease from the wastewater reduces the risk of early malfunction for systems serving food service facilities. Food service facilities are at a higher risk for early on-site wastewater treatment system malfunction. If the grease is not removed in the grease tank, septic tank, or pump tank, it will travel to the dispersal field and come out of suspension at the soil interface. The grease will clog the soil and cause premature malfunction of the dispersal field. Grease accumulation in grease tanks, septic tanks, and pump tanks can be removed. Once grease has congealed in the soil, it is almost impossible for the dispersal field to recover. A repair is required in the form of a replacement dispersal field.

The proposed rules require a capacity and configuration change in the grease tank. Currently, a single grease tank is installed as part of the on-site wastewater treatment system for food service facilities. The proposed rules state that for on-site wastewater systems with a required grease tank capacity over 1,500 gallons, two grease tanks in series are required.

On average, 100 to 200 grease tanks a year would be installed with on-site wastewater treatment systems. An average cost to install a second grease tank, including the cost of the tank and the installation charges, would be around  $$1,600^5$ . This is based on a second 1,000 gallon grease tank, which is what would be required at a minimum. The total grease tank capacity is based on the design flow which is project

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<sup>&</sup>lt;sup>5</sup> Based on information from a North Carolina Certified On-site Wastewater Contractor

specific. Tables 15 and 16 project the private sector costs associated with the increase in grease tank capacity.

Table 15. Summary of Costs from Grease Tank Capacity Changes, Year One\*

Facility Owner Costs	
Number of additional grease tanks installed	150
Cost per tank and installation in Year One**	\$1,801
Public Sector Costs	(\$270,150)

<sup>\*</sup>Values are presented in 2021 dollars.

Table 16. Summary of Benefits from Grease Tank Capacity Changes, Year One\*

Tank Manufacturer Benefits	
Number of additional grease tanks sold	150
Cost per tank and installation in Year One**	\$1,801
Revenue Benefits to Manufacturers	\$270,150

<sup>\*</sup>Values are presented in 2021 dollars.

#### Plans for Prefabricated Tanks

The proposed rules include a structural verification test. This structural verification test shows that the tank is able to withstand the loads acting on the tank (soil depth weight, water table force, people walking over tank, etc.). The structural verification test applies to all new approved tanks. Over the past ten years, the most tank approvals issued in one year was 24. That same number can be projected out over the next five years to provide a determination of the on-going costs associated with the proposed rule. Tables 17 and 18 projects the cost to the private sector for the tank structural verification tests.

Table 17. Private Sector Cost due to Structural Verification Test, Year One

Manufacturers Projected Cost Increases	
Average Number of New Tanks Submitted for Approval	24
Weighted Average Cost of Structural Verification Test (\$600 for precast concrete tanks and \$8,000 for plastic and fiberglass tanks)	\$1,525*
Total Cost to Private Sector (Number of New Tank Approvals x Average Cost)	(\$36,600)

<sup>\*</sup>This number was obtained in the following method: 21 tanks were estimated as precast concrete and three tanks were estimated as plastic or fiberglass. These numbers were based on tank approvals issued over the past ten years.

Table 18. Private Sector Benefits due to Approvals, Year One

Benefits to Third-party Testers and Certifiers	
Average Number of New Tanks Submitted for Approval	24
Initial approval fee	\$1,525*
Total Benefits to Testers and Certifiers	\$36,600

<sup>\*</sup>This number was obtained in the following method: 21 tanks were estimated as precast concrete and three tanks were estimated as plastic or fiberglass. These numbers were based on tank approvals issued over the past ten years.

Concrete tank design has been modified to increase concrete strength from 3,500 psi to 4,000 psi. The increased concrete strength will provide a stronger, better tank. The average cost increase for a concrete tank to increase the tank strength from 3,500 psi to 4,000 psi is \$40/1,000 gallon tank. Table 19 shows the private sector costs associated with proposed concrete tank design changes.

<sup>\*\*</sup>Assuming a 3% increase in cost per year.

<sup>\*\*</sup>Assuming a 3% increase in cost per year.

Table 19. Private Sector Cost due to Concrete Tank Design Changes,	Year One
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Private Sector Projected Cost Increases	
Average Number of New Septic Tanks Installed	17,176
Average Number of New Pump Tanks Installed	2,576
Average Number of New Grease Tanks Installed	150
Total Number of New Tanks Installed	19,902
Average Cost Increase Based on Concrete Tank Design Changes in 2021*	\$44
Cost to Private Sector (Number of New Tank Installed x Average Cost)	(\$875,688)

<sup>\*</sup>Assuming a 3% annual growth in cost.

#### Tank Material Requirements

The current rules specifically identify the design and construction for concrete tanks. Plans for other tanks are approved on an individual basis and evaluated based on the information provided. The information provided must demonstrate that the tank will provide equivalent treatment and performance to the concrete tanks.

Both concrete and plastic tanks are frequently used across North Carolina in on-site wastewater treatment systems. Fiberglass tanks are occasionally seen on large (over 3,000 gallons/day) systems. Fiberglass tanks cannot compete cost wise in the single-family home market and are more expensive than plastic and concrete tanks. For on-site wastewater treatment systems with a design flow over 3,000 gallons/day, the tank cost is already going to be greater due to the larger tanks. The additional cost for fiberglass tanks will not be as great in these systems.

The proposed rules contain criteria for plastic and fiberglass tanks that are not spelled out in the current rules. However, the proposed rules include the minimum material requirements and any design requirements that differ from concrete tanks. The most significant design difference between plastic and fiberglass tanks and concrete tanks is the wall thickness. Plastic and fiberglass tanks will have a much thinner wall than concrete tanks. This is a material difference.

Tank structural integrity testing is a way to spot check and confirm that the tanks installed meet the minimum rule requirements. OSWP strongly encourages the LHD to routinely spot check concrete tanks for strength. A Schmidt Rebound hammer or equivalent is used by OSWP and LHDs to check concrete strength. Plastic and fiberglass tanks do not have a piece of testing equipment that is relatively inexpensive and easy for LHD staff to use to check material strength. The plastic and fiberglass tank manufacturers will need to be enrolled in a third-party quality assurance and quality control program, which includes unannounced annual audits and materials testing. OSWP expects that most manufacturers are already B66 certified (meeting the requirements of the proposed rule) because such certification is required to be able to sell products in other states. The proposed rules will prevent any post-approval design modifications unless they are specifically approved.

The approximate cost for a manufacturer to obtain approval for a plastic or fiberglass tank under the proposed rules is \$30,000. The third-party cost to maintain this national certification on average is \$5,400 per year. The initial approval cost is a one-time cost. The cost to maintain the certification is an on-going cost. Over the past ten years, a total of 14 new plastic tanks have been approved. On average, three new plastic or fiberglass tank approvals will be issued per year. Tables 20, 21, 22, 23, and 24 identify the private sector costs associated with plastic or fiberglass tanks obtaining and maintaining approval.

Table 20. Manufacturer Cost due to Plastic or Fiberglass Tank Approvals, Year One\*

Manufacturer Projected Cost Increases	
Average Number of New Tanks Submitted for Approval	3
Initial approval cost (\$20,000 certifier fee plus staff time to develop submittal)	\$30,000
Total Costs	(\$90,000)

<sup>\*</sup>Values are presented in 2021 dollars.

Table 21. Manufacturer Ongoing Cost due to Approvals, Year Two and Beyond

Manufacturer Projected Cost Increases	
Average Number of New Tanks Submitted for Approval	3
Ongoing annual certification costs (\$2,700 certifier fee plus staff time to develop submittal)	\$5,400
Total Costs	(\$16,200)

Table 22. Private Sector Benefits due to Plastic or Fiberglass Tank Approvals, Year One\*

Revenue Benefits to Third-party Testers and Certifiers	
Average Number of New Tanks Submitted for Approval	3
Initial approval fees	\$20,000
<b>Total Benefits to Testers and Certifiers</b>	\$60,000

<sup>\*</sup>Values are presented in 2021 dollars.

Table 23. Private Sector Benefits due to Approvals, Year Two and Beyond

Revenue Benefits to Third-party Testers and Certifiers	
Average Number of New Tanks Submitted for Approval	3
Ongoing annual certification fees	\$2,700
Total Benefits to Testers and Certifiers	\$8,100

Table 24. Public Sector Costs to Review Initial Plastic or Fiberglass Tank Approvals, Year One\*

OSWP Review Costs	
Average Number of New Tanks Submitted for OSWP Approval	3
Total Cost in Man Hours for Approval by Engineer (Number of Approvals x 5 man hours x Hourly Compensation**)	\$1,037

<sup>\*</sup>Values are presented in 2021 dollars.

The current rules also specify that additional reinforcement is required for tanks that are placed deeper than three feet below the finished grade. How much additional reinforcement is not specified, and interpretation of this rule has varied in the past.

The proposed rules require all tanks buried deeper than three feet below finished grade to be designed by a PE for the proposed tank burial depth. The State shall review and approval the additional reinforcement tank designs.

<sup>\*\*</sup>Calculated based on 2016 government salary information for Engineers from NCOSHR and projected growth in NC state and local government wages from IHS Markit, and cost of employee benefits by industry from the US Bureau of Labor Statistics. The mid-range hourly wage rate, including benefits, is expected to be \$69.12 in 2021.

This cost associated with tanks buried deeper than three feet will be unquantifiable. There is no mechanism in place to track the number of tanks that are buried deeper than three feet. The tank design will vary based on the burial depth and current tank design. The PE could propose additional reinforcement, increase in the thickness of the tank lid, increased concrete strength, etc., to modify the tank design for the proposed burial depth. The tank design will be site and project specific.

## Plans for Risers, Effluent Filters, and Pipe Penetrations

Risers, effluent filters, and pipe penetrations are all used with tanks. Risers provide access to the tanks for routine operation and maintenance. This includes visual inspection of the tank and its contents, pumping tanks, effluent filter cleaning, maintenance of the pump and control system, etc. Effluent filters are located at the outlet end of septic tanks and grease tanks. They keep the scum layer (stuff that floats on top of the wastewater, such as toilet paper and cooking grease) in the tank and prevent the scum layer from moving on through the system to the dispersal field. Cast-in-place pipe penetrations provide for some flexibility with the pipes that exit the tanks. The tanks and pipes can settle over time since they are set on disturbed earth. By using a flexible pipe penetration, minor settling will not cause breaks in the tank, pipe, or connection.

OSWP has approved risers, effluent filters, and pipe penetrations for use with all State approved tanks for over 15 years. The criteria for these products has never been in the rules before. By including this criteria in the proposed rules, the manufacturers can easily identify the information required when applying to OSWP for review and approval.

The average cost to a manufacturer to apply for and receive approval of an effluent filter, riser, or pipe penetration is \$10,750. This cost includes the product certification cost verifying that the product meets the minimum requirements. Over the past 10 years, a total of five new risers and effluent filters (combined) have applied for and received approval from OSWP. Tables 25, 26, and 27 project the fiscal impact to effluent filter, riser, and pipe penetration manufacturers and OSWP for new approvals. Conservatively, OSWP expects applications to increase slightly, averaging one new application submitted per year.

The proposed rules also include a provision that all effluent filter, riser, and pipe penetration approvals will expire every year. The manufacturer will be required to submit a renewal form to OSWP with updated contact information and a notarized statement that the products have not changed from the previous year. This allows OSWP to verify contact information, that the products still meet current material standards, and are performing as anticipated by the product manufacturer.

Tables 28 and 29 project the fiscal impact to effluent filter, riser, and pipe penetration manufacturers and OSWP for approval renewals every year.

Table 30 summarizes the benefits associated with all of the proposed tank rule changes.

Table 25. Projected Private Sector Costs for Effluent Filters, Risers, and Pipe Penetration New Approvals, Year One\*

Manufacturer Projected Cost Increases	
Avg Number of Effluent Filter, Riser, or Pipe Penetration Applications	1
Average Private Sector cost to Collect Information and Write Report (\$650/application)	\$650
Third Party Product Verification Fee (\$10,000/application)	\$10,000
Total Costs	(\$10,650)

<sup>\*</sup>Values are presented in 2021 dollars.

Table 26. Projected Private Sector Benefits for Effluent Filters, Risers, and Pipe Penetration New Approvals, Year One\*

Private Certifiers, Testers, and Inspectors Benefits	
Avg Number of Effluent Filter, Riser, or Pipe Penetration Applications	1
Third Party Product Verification Fee (\$10,000/application)	\$10,000
Total Benefit to Private Certifiers, Testers, and Inspectors	\$10,000

<sup>\*</sup>Values are presented in 2021 dollars.

Table 27. Projected OSWP Costs for Effluent Filters, Risers, and Pipe Penetration New Approvals, Year One\*

- One	
OSWP Staff Projected Fiscal Impacts	
Avg Number of Effluent Filter, Riser, or Pipe Penetrations Applications to	1
Review	1
Total Cost in Man Hours for Approval Renewal by Engineer	(\$139)
(Number of Approval Renewals x 2 man hours x Hourly Compensation**)	(\$139)

<sup>\*</sup>Values are presented in 2021 dollars.

Table 28. Projected OSWP Costs for Effluent Filters, Risers, and Pipe Penetration Approval Renewals\*

	II
OSWP Staff Projected Fiscal Impacts	
Number of Effluent Filter, Riser, or Pipe Penetration Product Renewals per Year	23
Total Cost in Man Hours for Approval Renewal by Engineer (Number of Approval Renewals x 0.5 man hours x Hourly Compensation**)	(\$795)
Net Cost to OSWP	(\$795)

<sup>\*</sup>Values are presented in 2021 dollars.

<sup>\*\*</sup>Calculated based on 2016 government salary information for Engineers from NCOSHR and projected growth in NC state and local government wages from IHS Markit, and cost of employee benefits by industry from the US Bureau of Labor Statistics. The mid-range hourly wage rate, including benefits, is expected to be \$69.12 in 2021.

<sup>\*\*</sup>Calculated based on 2016 government salary information for Engineers from NCOSHR and projected growth in NC state and local government wages from IHS Markit, and cost of employee benefits by industry from the US Bureau of Labor Statistics. The mid-range hourly wage rate, including benefits, is expected to be \$69.12 in 2021.

Table 29. Projected Private Sector Costs for Effluent Filters, Risers, and Pipe Penetration Approval Renewals\*

Manufacturer Projected Cost Increases	
Number of Effluent Filter, Riser, or Pipe Penetration Product Renewals per Year	23
Average Private Sector Cost to Fill Out Approval Renewal Form (Number of product renewals x \$300/renewal)	\$6,900
Total Cost to Manufacturer	(\$6,900)

<sup>\*</sup>Values are presented in 2021 dollars.

Table 30. Summary of Benefits from All Tank Rule Improvements

Private Sector Benefits (homeowner, consultants, operators, installers)		
Potential reduction in on-site wastewater treatment system repair costs due to grease		
Quicker review of alternative tank material designs		
Increased concrete tank strength		
Public Sector Benefits (LHD and OSWP)		
Potential reductions in system malfunctions due to grease		
Increased concrete tank strength		
Up to date contact information from manufacturers to answer questions about the product		

Rule 15A NCAC 18E .1505 – Residential Wastewater Treatment System Approval Renewal Rule 15A NCAC 18E .1711 – Provisional and Innovative Approval Renewal

Currently, once a manufacturer of a residential wastewater treatment system (RWTS) or P&I system has received approval for their product, the manufacturer has that approval forever. OSWP has only revoked two approvals in more than 20 years. One manufacturer had let their required certification lapse; the other manufacturer was determined by OSWP to have failed to disclose a problem with their product that was later discovered in North Carolina installations. A number of these products are used on sites for which a conventional on-site wastewater treatment system cannot be installed. The site has limitations that require a more advanced on-site wastewater treatment system for the lot to be developed.

Under the proposed rules, the RWTS and P&I approvals will expire on December 31 every year. The manufacturer will need to submit a one-page renewal form to OSWP with updated contact information and a notarized statement that the products have not changed from the previous year. This allows OSWP to verify contact information and that the products continue to perform as anticipated by the product manufacturer. Manufacturers with a Provisional approval will also be required to submit an annual report with their one-page renewal form.

Additionally, the LHDs fill out a monthly activity report. This report includes information on the type of system, including RWTS and P&I products, installed. The LHDs submit this report to OSWP monthly. This information will assist OSWP with identifying the number of approved products being installed and product performance.

The costs for completion and review of the renewal form are projected in Tables 31 and 32. The costs and number of approvals should stay relatively consistent with time. Once a manufacturer has received approval, they will not want to lose the approval and re-start the product approval process from the beginning. Over the last five years, the average number of new P&I approvals issued was two per year. This does not include modifications to existing approvals. So, over a five-year period, the total number of product approvals could increase by ten (average of two a year). Table 33 summarizes the benefits associated with approval renewals for RWTS and P&I approvals.

Table 31. Projected OSWP Fiscal Impacts for Residential Wastewater Treatment System and Provisional and Innovative Approval Renewals\*

OSWP Staff Projected Fiscal Impacts	
Number of P&I Approval Renewals to Review	45
Number of RWTS Approval Renewals to Review	10
Total Cost in Man Hours for Approval Renewal by Engineer (Number of Approval Renewals x .5 man hours x Hourly Compensation**)	(\$1,901)

<sup>\*</sup>Values are presented in 2021 dollars.

Table 32. Projected Private Sector Fiscal Impacts for Residential Wastewater Treatment System and Provisional and Innovative Approval Renewals\*

Private Sector Projected Cost Increases	
Number of Innovative Approval Renewals to Review	31
Number of Provisional Approval Renewals to Review	14
Number of RWTS Approval Renewals to Review	10
Average Private Sector Cost to Fill Out Innovative and RWTS Approval Renewal Form (\$300/renewal form)	(\$12,300)
Average Private Sector Cost to Fill Out Provisional Approval Renewal Form and Annual Report (\$1,500/report and renewal form)	(\$21,000)
<b>Total Cost to Private Sector (Number of Approval Renewals x Report Cost)</b>	(\$33,300)

<sup>\*</sup>Values are presented in 2021 dollars.

Table 33. Summary of Benefits from Product Approval Renewals

Private Sector Benefits (homeowner, consultants, operators, installers)		
Updated list of approved products and current contact information		
Updated product approval that reflects current knowledge		
Public Sector Benefits (LHD and OSWP)		
Updating list of approved products and current contact information		
Method to verify that products going in the ground are the same as the products originally approved,		
including performance		

## IV. Rules with an unquantifiable fiscal impact

The rules identified in this part have an unquantifiable fiscal impact. There is not enough information to determine how many of these system types are utilized on an annual basis or to quantify the value added to calculate a fiscal impact. The twenty-three rules that fall into this category are as follows:

15A NCAC 18E .0303 – Licensed or Certified Professionals
Section .0400 – Design Daily Flow and Effluent Characteristics
15A NCAC 18E .0601 – Location of Wastewater Systems
15A NCAC 18E .0801 – Septic Tank Capacity Requirements
15A NCAC 18E .0908 – Drip Dispersal Systems (discussed with Rule .1204 and Section .1600)
15A NCAC 18E .1002 – Reclaimed Water Systems
15A NCAC 18E .1201 – Advanced Pretreatment System Standards
15A NCAC 18E .1202 – Siting and Sizing Criteria for Systems with a Design Daily Flow Less
Than or Equal to 1,500 Gallons/Day

15A NCAC 18E .1203 – Siting and Sizing Criteria for Systems with a Design Daily Flow Greater Than 1,500 Gallons/Day and Less Than or Equal to 3,000 Gallons/Day

<sup>\*\*</sup>Calculated based on 2016 government salary information for Engineers from NCOSHR and projected growth in NC state and local government wages from IHS Markit, and cost of employee benefits by industry from the US Bureau of Labor Statistics. The mid-range hourly wage rate, including benefits, is expected to be \$69.12 in 2021.

15A NCAC 18E .1204 – Advanced Pretreatment Drip Dispersal Systems

Section .1600 rules – Approval and Use of Pre-Engineered Package Drip Dispersal Systems

Section .1700 rules (except .1710 and .1711, addressed above) – Approval and Permitting of

Wastewater Systems, Technologies, Components, or Devices

Rule 15A NCAC .0303 – Licensed or Certified Professionals

As one of the compromises reached by the Task Force when reviewing all the rules, all pressure manifold systems with a design daily flow greater than 600 gallons/day must now be designed by a PE. The North Carolina Board of Examiners for Engineers and Surveyors has determined that these designs meet the definition of engineering. Currently, these systems are designed by the LHD unless the system is designed by an authorized designer or PE.

This will be an increased cost to the owner. If the LHD designed the pressure manifold, there was no additional charge to the owner. This requirement will also be a time savings for the LHD, since they will no longer have to design these systems. The minimum cost for a PE to design a pressure manifold with a design flow greater than 600 gallons/day is \$3,000. As the size of the system increases, the cost to design the system will increase.

Section .0400 – Design Daily Flow and Effluent Characteristics Rule 15A NCAC 18E .0401 – Design Daily Flow Rule 15A NCAC 18E .0402 – Septic Tank Effluent Characteristics Rule 15A NCAC 18E .0403 – Adjustments to Design Daily Flow

Section .0400, Design Daily Flow and Wastewater Characteristics, has been updated to reflect an expanded list of facilities, a clarification of domestic strength wastewater, and additional options to facilitate facility flow reductions, including addressing the issue of wastewater strength.

The list of facilities in the current rules has not been updated in over 31 years. Actual wastewater flows are generally less than the daily flows currently listed. Many facilities request, and receive, flow reductions based on actual water use or the use of low-flow fixtures. The reduction in daily flows will result in smaller on-site wastewater treatment systems installed. The smaller on-site wastewater treatment system will cost the facility owner less to install, operate, and maintain. However, lower flows, especially with the use of extreme low-flow fixtures, may result in wastewater strength that is greater than domestic strength, which is clarified in the proposed rules.

The expanded facility list in Rule .0401 will help LHDs calculate design daily flows in a shorter time frame. For facilities that are not currently listed, the LHD consults with OSWP to determine a design flow. Sometimes this can take a couple of days to research (to be consistent with what OSWP has recommended to other LHDs) and provide the LHD with a final answer. The expanded list will ultimately result in permits being issued in a shorter time frame.

The clarification of domestic strength wastewater in Rule .0402 allows the on-site wastewater industry to define up front which facilities generate higher strength wastewater and account for that in the design from the beginning, instead of after the on-site wastewater treatment system is failing. The current rules have different values for what is or is not domestic strength wastewater in different rules. By clearly identifying the wastewater strength with the design flow, OSWP, LHDs, and consultants will be able to educate owners regarding the impacts of the wastewater quality on public health and the environment. This may impact some owners with specific plans for their property. The facilities identified as higher than domestic strength wastewater in Section .0400 have all been previously identified as such by the onsite wastewater industry, but not all owners are aware of the wastewater strength of these facilities.

Some owners or developers may have increased design and construction costs due to the need for advanced pretreatment or additional design work to show that the wastewater quality will not harm public health and the environment. This will impact both new and existing facilities. The existing facilities will be impacted when an owner is expanding their facility and needs to expand their on-site wastewater treatment system. The proposed rules will require that the wastewater be evaluated. This could require the owner to add advanced pretreatment to the on-site wastewater treatment system or hire a consultant to determine the impact on the environment for the facility expansion. This will be site specific and vary based on the type of soil, wastewater characteristics, and site characteristics (wells, lakes, ponds, shallow water table, bedrock, etc.).

Rule .0403, Adjustments to Design Daily Flow, accounts for both hydraulic and organic changes to the design daily flow. The current rules only account for adjusting the design daily flow based on the amount of water used. The increased wastewater strength was not directly addressed, just referenced as "further adjustments shall be made when the wastewater characteristics exceed those of domestic wastewater". The proposed rules require that whenever a flow reduction is requested, the wastewater strength is also evaluated. The evaluation could include advanced pretreatment or a determination of the impact of the increased wastewater strength on the environment.

This rule also identifies how to address flow reductions for systems designed to treat wastewater that has nitrogen concentrations higher than domestic strength. Many schools and RV parks have septic tank effluent concentrations that are very high in nitrogen. Nitrogen is one of the known wastewater constituents that can have a significant impact on public health and the environment. "Blue baby syndrome," or methemoglobinemia, has been attributed in some cases to nitrate contaminated drinking water that is given to infants. The nitrate reduces the oxygen carrying capacity of the infant's blood. High levels of nitrogen in surface water can cause eutrophication, where the algae in the water blooms in excess (due to the increased nitrogen in the water) and reduces the water's oxygen levels. This decrease in oxygen levels impacts fish and other aquatic life. By addressing the potential increase in effluent nitrogen levels, the impact on public health and the environment can be minimized.

The private sector will see the biggest impact financially from Section .0400. While the increased facility list, clarified domestic strength wastewater criteria, and expansion of design daily flow reduction options will help reduce the permitting time requirement and allow for smaller systems, the requirement to take into account wastewater strength will require additional design calculations or advanced pretreatment systems for some sites. Many sites currently being permitted for higher than domestic strength wastewater facilities already have advanced pretreatment in the on-site wastewater treatment system. This is due to the industry's knowledge of the problems with high strength wastewater or other soil and site limitations.

The types of facilities that could be impacted will include the following: restaurants, summer camps, food stands, other food service establishments, meat markets, fish markets, schools, RV parks, rest areas and visitor centers, convenience stores with food service and public restrooms, service stations with public restrooms, rest homes, assisted living homes, nursing homes, day camps, and temporary labor camps. Other facilities could be included in this list in the future if it is determined, with experience, that the wastewater strength exceeds domestic wastewater strength.

While the complete universe of potentially affected existing and new facilities is unknown, the number of existing schools and restaurants in the state exceeds 3,000<sup>6</sup> and the number of existing assisted living and nursing homes exceeds 1,000.<sup>7</sup> Only a fraction of these existing facilities utilize on-site wastewater treatment systems and will be affected by the rules in any given year, dependent upon when an owner is expanding their facility and needs to expand their on-site wastewater treatment system and the wastewater characteristics. The addition of advanced pretreatment would cost the owner approximately an additional \$26.50/gallon of wastewater treated when compared to a conventional on-site wastewater treatment system without advanced pretreatment.

The private sector could also see some benefits from advanced pretreatment being used with high strength wastewater on-site wastewater treatment systems. The on-site wastewater treatment systems with advanced pretreatment are more likely to have much longer life span. Since the wastewater strength will be lower, the dispersal field will be more likely to have a standard on-site wastewater treatment system life span or even to possibly exceed it.

The advanced pretreatment system may also allow the owner to expand the facility without having to expand or modify the on-site wastewater treatment system. If the water use is lower than the design flow and the advanced pretreatment system is meeting domestic strength limits, more wastewater could be discharged to the system without needing to expand the dispersal field at all.

Overall, the impact to OSWP and LHDs will be offset by rule changes. The time savings from the expanded facility list will be offset by the sites that will have additional design calculations or advanced pretreatment system designs to review. Table 34 summarizes the associated benefits from the proposed changes to design daily flows and effluent characteristics.

Table 34. Summary of Benefits from Changes to Design Daily Flow and Effluent Characteristics Rules

## Private Sector Benefits (homeowner, consultants, operators, installers)

Faster permit issuance (due to quicker calculations of design daily flow)

Potential longer life of on-site wastewater treatment systems based on consider of wastewater strength Potential future facility expansion without significant on-site wastewater treatment system modifications

#### **Public Sector Benefits (LHD and OSWP)**

Quicker calculations of design daily flow

Clearer definition of domestic wastewater strength and high strength wastewater

# Rule 15A NCAC .0601 – Location of Wastewater Systems

Several changes were made to the current rules to address issues that had been brought up regarding horizontal setbacks from on-site wastewater treatment systems. The changes included adding clarifying language so that the setback could be consistently addressed across the state, working with other regulatory agencies to verify that the setbacks listed in the proposed rules did not conflict with their rules, and reducing setbacks based on years of experience by numerous individuals in both the public and private sectors.

<sup>6</sup> School data provided by NCDPI and Private School Review, accessed at <a href="http://www.dpi.state.nc.us/docs/fbs/resources/data/factsfigures/2015-16figures.pdf">http://www.dpi.state.nc.us/docs/fbs/resources/data/factsfigures/2015-16figures.pdf</a>; <a href="https://www.privateschoolreview.com/north-carolina">https://www.privateschoolreview.com/north-carolina</a>

<sup>&</sup>lt;sup>7</sup> This figure includes adult care homes (assisted living) and nursing homes licensed by the NC Division of Health Services Regulation. Data accessed at <a href="https://www2.ncdhhs.gov/dhsr/reports.htm">https://www2.ncdhhs.gov/dhsr/reports.htm</a>

One of several changes made includes the following setback reduction. Under the current rules, an on-site wastewater system must be located a minimum of 100 feet from a private drinking water well on an individual site. That distance may be reduced to 50 feet, but no less than 50 feet, based on space limitations or to repair a failing on-site wastewater system. This reduction in a horizontal setback still protects the public health and the environment but recognizes that space limitations can occur on individual lots. There is one exception to the above allowance, and that is when the on-site wastewater system is installed in saprolite. Saprolite is decomposed weathered rock that is located above bedrock and beneath soil. Saprolite is generally found in the piedmont and mountain regions.

Several comments were received by OSWP suggesting allowing the reduction from 100 feet to 50 feet for on-site wastewater systems installed in saprolite. After reviewing the scientific research conducted by professors at North Carolina State University, OSWP has determined that water primarily moves vertically in saprolite. OSWP agreed that the horizontal setback should be reduced from 100 feet to 50 feet for saprolite systems, similar to what is done for other on-site wastewater systems. This setback reduction can only be done with a variance, since the private drinking water well rules require the 100-foot setback to a saprolite system. The variance is issued by the OSWP staff.

It is impossible to determine the number of sites that will be positively impacted by the reductions in the horizontal setbacks. These sites would have been denied due to a lack of available space for the on-site wastewater treatment system to meet all the current rules. This proposed rule change will allow sites that would have previously been denied or would require a more expensive system to have a conventional on-site wastewater system installed.

## Rule 15A NCAC .0801 – Septic Tank Capacity Requirements

Sometimes, the plumbing from the facility exits the building lower than originally planned and the wastewater from the facility cannot flow by gravity to the on-site wastewater treatment system. This occurs most frequently when a homeowner decides to add a bathroom to the basement, and the plumbing is already designed to flow by gravity from the first floor. So, a grinder pump station is installed to bring the wastewater from the basement up to the gravity sewage pipe already installed to flow into the septic tank for the on-site wastewater treatment system. The grinder pump station is permitted by county Building Inspections departments and often the on-site wastewater treatment system is already installed and in use when the grinder pump station is discovered by the LHD.

Grinder pumps do exactly what their name implies. The pump grinds up the solids in the wastewater as part of the pumping process. Septic tanks are designed for a minimum wastewater retention time to allow a significant portion of the solids in the wastewater to settle out. The smaller-sized particles resulting from use of a grinder pump tend to stay in suspension within the septic tank. This can increase the amount of solids and organic matter that is discharged to the dispersal field and can result in premature system failure.

The proposed rules require that the septic tank capacity be doubled whenever a grinder pump station is used to move wastewater from the facility to the on-site wastewater treatment system. By doubling the retention time in the septic tank, a higher percentage of these small solids can be removed from the wastewater before it discharges to the dispersal field.

The homeowner could try to lower the existing septic tank, but that could be a complicated option. If the burial depth of the septic tank is greater than three feet, the septic tank would need to be designed by an PE with additional reinforcement. The original septic tank potentially could not be used. And if the onsite wastewater treatment system is already in use, this complicates the re-location of the existing septic

tank even further. The homeowner could decide to add a second septic tank in a series, forego the renovation, or risk being noncompliant.

It is impossible to determine the number of grinder pump stations that are installed prior to an on-site wastewater treatment system. The LHD will not have a record of the grinder pump station since it is permitted by county Building Inspections departments, not the LHD. If the system has already been installed, the LHD may never be made aware of the grinder pump station until a problem occurs with the on-site wastewater treatment system. If a LHD discovers a grinder pump station when a problem occurs, the best corrective action in most cases will be to install a second septic tank in series. An average cost to install a second septic tank, including the cost of the tank and the installation charges, would be around \$1,6008. Table 35 summarizes the associated benefits from increasing septic tank capacity when a grinder pump is used.

Table 35. Summary of Benefits from Increases to Septic Tank Capacity Requirements when a Grinder Pump is Used Prior to the Septic Tank

# Private Sector Benefits (homeowner, consultants, operators, installers)

Potential longer life of on-site wastewater treatment systems (due to the reduction of effluent solids that will pass through the septic tank and effluent filter)

# **Public Sector Benefits (LHD and OSWP)**

Potential longer life of on-site treatment wastewater systems

Clearer definition of what is required when a grinder pump is used prior to an on-site wastewater treatment system

.0908 – Drip Dispersal Systems

.1204 – Advanced Pretreatment Drip Dispersal Systems

Section .1600 – Approval and Use of Pre-Engineered Package Drip Dispersal Systems

.1601 – General

.1602 – Design and Construction Standards

.1603 – Drip Dispersal System Testing

Drip dispersal systems have been in use in North Carolina for on-site wastewater treatment systems since 1993. The siting, design, and installation criteria have been revised and updated over the years to reflect current thinking with the technology. For many years, OSWP's goal has been to include drip dispersal systems in the rules. Drip dispersal systems are currently issued a P&I approval under Rule 15A NCAC 18A .1969. In the proposed 18E rules, Rule .1969 is now Section .1700. The P&I approvals contain the manufacturer specific drip dispersal system information: soil and site evaluation criteria and the minimum siting criteria, system design and installation, and operation and maintenance. The P&I approval helps expedite the permitting process in many ways. The P&I approvals also specify when a licensed professional, such as a PE or LSS, is required.

The LHD can issue a permit based on the information in the drip dispersal P&I approval. Some LHDs may request OSWP assistance, but many can review a drip dispersal system proposal using the P&I approval.

The existing criteria from the P&I approval are being proposed for adoption in these rules. The fiscal impact of adding the drip dispersal system P&I approval information to the proposed rules is a neutral or positive change for drip dispersal system manufacturers. The information and standards the products must meet are now identified in rule, which allows the manufacturers to know the criteria that must be

<sup>8</sup> Based on information from a North Carolina Certified On-site Wastewater Contractor

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met prior to making an application for a drip dispersal system. This information has been required to be provided by all manufacturers currently approved for drip dispersal systems. By adding this information to the proposed rules, OSWP is providing transparency to and streamlining the P&I approval process.

The approximate cost for a manufacturer to obtain P&I approval for a drip dispersal system under the proposed rules is unquantifiable. While the current criteria for P&I approval are in the proposed rules, the P&I approval process, and showing that a product or component meets that criteria, is impossible to predict based on the potential product variations in the industry.

Since 1993, when the first drip dispersal P&I approval was issued, a total of six drip dispersal P&I approvals have been issued. At the most, one new application might be received over the next five years for a new drip dispersal P&I approval. Table 36 summarizes the benefits associated with adding drip irrigation to the proposed rules.

Table 36. Summary of Benefits with Adding Drip Irrigation

# **Private and Public Sector Benefits**

Streamlined application and P&I approval process

Clarification of information required for P&I approval

Reduced time from application submittal to P&I approval

Rule 15A NCAC 18E .1002 – Reclaimed Water Systems

Rule 15A NCAC 18E .1201 – Advanced Pretreatment System Standards

Rule 15A NCAC 18E .1202 – Siting and Sizing Criteria for Systems with a Design Daily Flow Less Than or Equal to 1,500 Gallons/Day

Rule 15A NCAC 18E .1203 – Siting and Sizing Criteria for Systems with a Design Daily Flow Greater than 1,500 Gallons/Day and Less Than or Equal to 3,000 Gallons/Day

Advanced pretreatment systems are used on sites with moderate to severe soil and site limitations. The soil depth may be so limited that a conventional on-site wastewater treatment system cannot be installed. A house and on-site wastewater treatment system may not be able to be installed on a site and meet all the horizontal setbacks required.

The use of advanced pretreatment allows for the reduction in some siting and sizing criteria for on-site wastewater treatment systems or an increase in the soil loading rate. The effluent is treated to a much higher quality, so the reduction in siting and sizing criteria or increase in soil loading rate does not increase the risk to public health. Advanced pretreatment systems are required to contract with a certified subsurface operator to visit the system at least twice a year. The operation permit for an advanced pretreatment system expires every five years. These requirements help the LHDs to ensure protection of public health and the environment.

## Reclaimed Water Systems

Reclaimed water systems have been added in the proposed rules. Reclaimed water systems are defined as treated wastewater effluent meeting established standards and using the effluent for beneficial reuse. Beneficial reuse means that the water is being used in a beneficial manner and to conserve the State's water resources by reducing the use of potable, surface, and groundwater resources. Some examples of beneficial reuse include toilet flushing and irrigation of lawns or flower beds.

Industry stakeholders advocated the addition of reclaimed water systems to the proposed rules. There is an increased cost associated with treating the wastewater to a higher effluent standard. Reclaimed water systems, though, allow the owner a cost savings with regards to the use of potable water. Golf courses

use a significant amount of water to irrigate the greens. Many times, the water used for irrigation is potable water. Using a reclaimed water system, the owner can reduce the amount of potable water used for irrigation and use reclaimed water to irrigate the greens. Besides saving the owner potable water costs, the use of reclaimed water is conserving water resources.

Due to the cost associated with reclaimed water systems, including long term operation, maintenance, and management, it is unlikely these would be used for single family residences. These will more likely be used for larger systems where the added cost for reclaimed water is not a significant portion of the overall wastewater system cost.

OSWP and LHDs already have the infrastructure in place to deal with review, permitting, and inspection of reclaimed water systems (another type of advanced pretreatment system).

During the last drought, OSWP received many requests about using wastewater effluent for lawn irrigation and other beneficial purposes, to reduce the use of potable water. Although a drought is not currently in progress, OSWP and the on-site wastewater industry recognize that when another drought comes to North Carolina, this is going to be one way to conserve potable water that owners will be asking for. The option to permit these systems needs to be included now, during this rulemaking, so that everyone in the on-site wastewater industry is ready for the next drought.

The ability to conserve potable water, whether during a drought or not, is an unquantifiable fiscal impact that has a net overall positive impact on North Carolina and its water resources.

## Advanced Pretreatment System Standards

One change was made to the effluent quality standards in the proposed rules. The total nitrogen limit in the current rules is less than or equal to 20 mg/L or greater than 60% removal. The "60% removal" provision was removed from the proposed rules.

Most advanced pretreatment systems approved for use with on-site wastewater treatment systems in North Carolina recirculate some portion of the effluent back to the septic tank at the beginning of the wastewater system. This is a critical configuration to facilitate nitrogen removal. When the effluent is recirculated back to the septic tank, it blends with incoming wastewater. Since the unreduced concentrations have been diluted, it is difficult to determine the percent removal of total nitrogen. Removal of the 60% standard allows a more straightforward determination of whether or not the on-site wastewater treatment system is in compliance with the effluent standard.

# Siting and Sizing Criteria for Systems with a Design Daily Flow Less Than or Equal to 1,500 Gallons/Day

Siting and Sizing Criteria for Systems with a Design Daily Flow Greater than 1,500 Gallons/Day and Less Than or Equal to 3,000 Gallons/Day

The design flow limitation for using advanced pretreatment and the reduction in siting and sizing criteria or an increase in the soil loading rate is currently 1,000 gallons/day for advanced pretreatment systems meeting treatment standards TS-I and TS-II and 1,500 gallons/day for advanced pretreatment systems designed to meet treatment standard NSF-40. The proposed rules will increase that design flow to 1,500 gallons/day. The flow was increased to provide a consistent number across all treatment standards.

This design flow increase could impact at least 100 sites per year. The 100 sites per year is based on the average number of sites that the coastal LHDs determined would be impacted by this rule change. Coastal counties generally have more advanced pretreatment systems in their counties than the rest of the counties in North Carolina. The lots in the coastal counties are typically smaller and the advantages provided by advanced pretreatment allow lots to be developed in accordance with the owner's plans.

Sites that may not meet the siting and sizing requirements in the current rules with a design flow over 1,000 gallons/day would be limited in their options. The owner may need to scale back the plans for what they would like to do or not even develop the site at all. By increasing the design flow limit that can be used with advanced pretreatment and siting and sizing reductions or an increase in the soil loading rate, these sites can now be developed. The benefit to the owner is incalculable but likely significant, as this rule change allows them to develop a site that could have been previously denied for their proposed plans.

Additionally, by increasing the design flow for all treatment standards for all siting and sizing reductions or increase in soil loading rates, it is easier for the LHDs and private consultants to provide land owners with an evaluation of the options available for the property. The risk to public health and the environment will not be increased by this change. Advanced pretreatment technology is approved in North Carolina to treat wastewater to NSF-40, TS-I, and TS-II standards. If the advanced pretreatment technology is proposed for a site with limitations, a special site evaluation has to be performed to show that the on-site wastewater treatment system will not adversely impact surface or groundwaters.

Section .1700 - Approval and Permitting of Wastewater Systems, Technologies, Components, or Devices

- .1701 General
- .1702 Application
- .1703 Department and Commission Application Review
- .1704 Approval Criteria for Provisional Systems
- .1705 Approval Criteria for Innovative Systems
- .1706 Approval Criteria for Accepted Systems
- .1707 Design and Installation Criteria for Provisional, Innovative, and Accepted Approvals
- .1708 Modification, Suspension, and Revocation of Approvals
- .1709 Wastewater Sampling Requirements for Advanced Pretreatment Systems, Including Reduced Sampling Requirements
- .1710 Compliance Criteria for Advanced Pretreatment Systems
- .1711 Provisional and Innovative Approval Renewal\*
- .1712 Authorized Designers, Installers, and Management Entities
- .1713 Local Health Department Responsibilities

Wastewater systems, technologies, components, or devices not specifically listed in the rules can be approved under a separate rule that specifies the minimum requirements needed for P&I approval. This allows new technologies to be approved in North Carolina without requiring any changes to the rules. Manufacturers can also easily modify, adapt, or change their product without having to go through the formal rule making process.

The types of systems not specifically listed in the rules, but approved using this process, can include alternative dispersal field products, advanced pretreatment systems, and other wastewater system components.

There are four different levels of approvals identified in the current rules: experimental, controlled demonstration, innovative, and accepted. Experimental approvals were removed from the General Statutes by Session Law 2015-286, Section 4.15(a). Provisional approvals, previously known as controlled demonstration approvals, are for products that have some data or have been approved by a national testing facility. Wastewater systems approved as innovative have a large amount of data that has been collected about them or have previously received an experimental or provisional approval and met all the criteria in the approval.

Session Law 2019-151, Section 13, gave trench products currently listed in the Rules the ability to apply for Accepted status. Previously, only trench products with an innovative approval could apply for Accepted status. When a product has Accepted status, that product can be substituted for a conventional on-site wastewater treatment system or another product with Accepted status without prior approval of the LHD. The product design and layout must fit in the area approved by the LHD and certain design features, such as the trench depth or the method of distributing effluent to the trenches cannot change. The owner or the installer can choose to make the substitution. When the LHD comes out to conduct the final inspection, they will make a note in the file of the trench product installed if it has changed from what was on the permit.

After applying for Accepted status, a survey must be done on the product to verify that its performance is as good as or better than a conventional trench. The survey is done by a third party hired by the trench product manufacturer. A minimum number of systems must be surveyed during the months of January through April 15<sup>th</sup>, which is considered to be the wet season and the most stressful time of year for an on-site wastewater treatment system.

Session Law 2015-286 made numerous changes to G.S. 130A-343, which deals with the approval levels and criteria of these systems not specifically listed in the rules. The Session Law also required that the rules be updated to reflect the changes made to G.S. 130-343. The changes simplified the approval level options and expanded the options for a manufacturer to obtain approval, while maintaining a comparable level of rigor in the certification process. When making the changes required by Session Law 2015-286, OSWP staff also made additional changes to clarify the current rule.

The changes Session Law 2015-286 made to G.S. 130A-343 are as follows:

- Changed the definition of accepted systems to apply only to trench products and exclude advanced pretreatment systems.
- Changed the term "controlled demonstration" to "provisional."
- Deleted experimental wastewater system approvals.
- Provided an alternative method for reducing effluent sampling criteria for advanced pretreatment wastewater systems.
- Provided time frames for OSWP review and approval of products.
- Provided alternative criteria for issuing a product a provisional approval.

In addition to updating the rule to reflect the Session Law changes, the current rule does not clearly lay out the requirements for P&I approval, information required to be provided by the applicant or manufacturer, or the criteria the information must meet. The proposed rules reorganize the current rule into a format that makes it easier for a manufacturer to identify the application information needed and the criteria that information must meet.

#### VI. ALTERNATIVES

Alternative #1: Require leak testing of all tanks installed in on-site wastewater treatment systems.

In the current rules, tanks are only required to be leak tested when the water table is within five feet of the ground surface and a mid-seam pump tank is used, with advanced pretreatment systems, and engineered design systems. OSWP staff looked at requiring every tank installed in an on-site wastewater treatment system to be leak tested, either with a hydrostatic test or a vacuum test.

The cost to implement this would increase the cost of the simplest system (septic tank to gravity dispersal field) by around \$1,000 per system (about 20%). As on-site wastewater treatment systems increased in size or complexity, and the cost of the system increased, the percent total of the system cost would decrease for tank leak testing. However, the majority of systems installed in North Carolina are single family residence systems that do not require advanced pretreatment.

This does not include the added cost to the LHDs. LHD staff would need to go back out to the site to verify the leak test results. This would result in at least one additional trip to the site at a minimum. For the small LHDs, this could end up being a significant burden on their limited staff resources.

In summary, the costs for leak testing all tanks impact both public and private sectors significantly. The quality of tanks installed in North Carolina has improved over the past 20 to 30 years and this is not a viable and cost-effective option for moving the tanks to the next level. Additionally, current processes are sufficiently protective of public health and the environment. Other options are available, that are less expensive, to improve tank quality.

# Alternative #2: Product re-approvals for compliance with the rules

The proposed rules included a provision for product approvals to expire every five years, with the manufacturer re-applying for approval. The manufacturer would provide documentation to support the re-approval of their product. After reviewing the comments and meeting with stakeholders, a compromise was suggested by one of the stakeholders. Washington State has an annual re-approval process for all their approved products. The re-approval process is just an application with current contact information and a notarized signature under a statement verifying that the product has not changed. This approach, or one very similar to it, was a reasonable compromise. Manufacturers would not have to collect and submit detailed information regarding their product performance and OSWP received current contact information and verification from the manufacturer that the product had not changed. The cost for the scaled down re-approval process would be significantly less to both the public and private sectors.

## Alternative #3: Requiring grease tanks to obtain a separate tank approval

In the current rules, grease tank designs are almost identical to septic tank designs. The majority of grease tanks installed are modified septic tanks. OSWP staff looked at requiring grease tanks to have a separate grease tank approval issued by the State.

The cost to implement this would be around \$3,500 per tank form and each tank has two forms, a top half form and a bottom half form. The total cost per tank would be \$7,000. There are very few problems with the current process. (The main problem being tanks that have never been state approved being installed as a grease tank.) Based on the lack of problems with the current process, and the high cost to tank manufacturers for requiring grease tanks to have an approval number, it did not make fiscal sense to include this in the proposed rules.

#### VII. UNCERTAINTY AND RISK ANALYSIS

The following items have the greatest uncertainty in this analysis: the number of new building permits, number of grease tanks installed, number of on-site wastewater treatment systems requiring advanced pretreatment due to high strength wastewater, and the impacts to the LHDs from Type IIIb and Type IIIh inspection requirements.

The number of new building permits drives everything. If the number of permits increases, the LHDs and private sector both stay busy keeping up with permitting, installing, and maintaining on-site wastewater treatment systems. If the economy drops, and the number of new building permits drops, everyone sees less work and must come up with new sources of revenue.

Table 37 below shows the net cost of the proposed rules under one alternate scenario: higher than expected septic tank installations (permits) over the next four years. The estimated net cost of the rules would increase by approximately \$1.5 million under the high-permit scenario.

There is uncertainty in both the method used to determine the historical number of permits and the projected number of permits. The historical number of permits issued each year was calculated in the following manner: the number of new construction authorization permits issued and the number of LHDs responding were determined from the OSWP County On-Site Activity Reports. Each year was evaluated for the LHDs that did not respond. To provide an estimate of the number of permits issued for the missing values, the median was calculated based on the information for that LHD in the rest of County On-Site Activity Reports. The yearly total was calculated including the median number of permits for the missing LHD records.

The projected number of permits issued was based on statewide building permit projections, weighted by county population growth projections. The total number of projected building permits was multiplied by the percent of households in each county using on-site wastewater treatment systems to estimate the number of new on-site wastewater treatment systems permits for 2019 through 2024. The percent of households in each county using on-site wastewater systems is based on the 1990 U.S. Census Bureau data, the most recent year for this information. See Appendix A for additional information on the permit estimates.

If the economy improves and home construction increases, the LHDs will see an increase in the number of applications received. This, in addition to the requirement for existing system inspections, will increase the LHD workload. Not all LHDs are back to the staffing levels they were at before the recession, and it takes time to hire, train, and have new staff ready to issue permits. Also, if some of the LHDs choose to offer the private inspection option for Type IIIb and IIIh systems, they could lose a revenue stream that will further impact the LHD. How much this will impact the LHDs will depend upon whether or not the LHD is currently conducting compliance inspections for Type IIIb and IIIh. LHDs can choose to continue their current program, implement a program if they do not have a program, or require the owners to hire a certified subsurface operator to inspect the system.

The LHDs have many priorities that they must attend to daily. Compliance inspections may fall further down on the priority list based on the current staffing needs and priorities. It is unknown how many LHDs will choose to offer the private option to owners as that will be a very county specific decision based on their specific needs. OSWP assumes that LHDs are currently optimizing their time according to task priority. Therefore, OSWP assumes that LHDs which currently perform these inspections will continue to do so (since the inspections generate revenue for LHDs, on net), and those LHDs that currently do not have sufficient staff time to conduct the inspections will authorize private inspectors.

<sup>10</sup> NC Office of State Budget and Management (2016). *Annual County Population Totals* 2017-2021. Accessed at http://www.osbm.nc.gov/demog/county-projections.

<sup>&</sup>lt;sup>9</sup> IHS Connect (September 2016). *State Analysis: Forecast Data: Annual Data – North Carolina*. Accessed at https://www.ihs.com/index.html.

<sup>&</sup>lt;sup>11</sup> U.S. Census Bureau (1990). *1990 Census of Population and Housing – Sewage Disposal*. Accessed at https://www.census.gov/mp/www/cat/decennial\_census\_1990/1990\_census\_of\_population\_and\_housing\_summary\_tape\_file\_3a.html

OSWP's best estimate of the proportion of compliance inspections currently performed by LHDs is 50%. The net cost of the rule over the next five years, including all affected parties, would be lower than estimated if LHDs choose to decrease the proportion of inspections they perform. On the other hand, if LHDs decide to perform more than 50% of the inspections, the net cost of the proposed rules would be higher than estimated (see Table 37 below).

The number of grease tanks installed will vary greatly per year. It is based on the number of restaurants, food stands, schools, nursing homes, dining halls, and other food service facilities that are built. The numbers of these facilities increase and decrease over the years, in no particular pattern, so it is difficult to project a number of new installations per year. If the economy continues to increase and commercial businesses also increase, the number of grease tanks installed could increase as people decide to open restaurants or food stands. OSWP assumes that 150 grease tanks a year (within a range of 100-200) would be installed with on-site wastewater treatment systems, on average, based on numbers from the Food Protection Facilities Branch and the requirement to increase grease tank capacity by installing two grease tanks. Because the additional cost to the facility owner for installing a second grease tank is an equivalent benefit to the manufacturer, the number of grease tank installations has a neutral effect on the net impact of the rule from a statewide perspective.

The number of systems that will be required to have advanced pretreatment because the wastewater strength is higher than domestic is almost impossible to predict. It is very dependent on facility type and proposed wastewater flow. The cost per system will also vary greatly because it will be very project specific. For some facilities, like restaurants or food stands, the primary contaminants of concern, grease and organic load, will be relatively straight forward to remove. High levels of nitrogen can be more complex to reduce, and systems designed to reduce nitrogen can require more operational flexibility so that the system can be operated to meet the required limits.

The on-site wastewater treatment system cost is very site specific. Most of the on-site wastewater treatment systems installed in North Carolina are still conventional wastewater treatment systems, without a pump. However, for limited sites there are options if a homeowner wants to build. The proposed on-site wastewater treatment system, such as advanced pretreatment and drip dispersal field, is more expensive than the conventional system, but still allows the homeowner the option to build on their land.

In the Sensitivity Analyses, the overall Net Impact over five years has decreased since the overall cost to implement the rules has decreased compared to the original rule proposal. The difference from the model for Annual Type IIIb and IIIh inspections stayed the same, but the overall Net Impact decreased from the previous fiscal note. The difference from the model changed for the annual number of new septic tanks based primarily on the reduction in tank material cost. That reduced the overall impact on implementing the rules.

Table 37 shows the impact of the sensitivity analysis on the Net Present Value for 15A NCAC 18E.

Table 37. Sensitivity Analysis on Net Economic Impact (Net Present Value)

#### **SENSITIVITY ANALYSES**

Annual New Septic Tank Permits	2021	2022	2023	2024
High Range	25,693	25,531	25,237	24,984
Modeled Range	17,176	17,068	16,871	16,702

	Net Impact,	Difference from
Annual New Septic Tank Permits	5 yrs	Model
High Range	(\$4,933,601)	(\$1,521,279)
Modeled Range	(\$3,412,322)	\$0

Annual Type IIIb and IIIh Inspections - LHD Completion Rate	Net Impact, 5 yrs	Difference from Model
10%	(\$1,569,838)	\$1,842,484
30%	(\$2,491,080)	\$921,242
50%	(\$3,412,322)	\$0
70%	(\$4,333,564)	(\$921,242)
90%	(\$5,254,806)	(\$1,842,484)

# **APPENDIX A: Projected New Construction Authorization Permits**

The analysis below indicates that the number of permits issued per year will slowly decrease between 2018 and 2024.

1. Wastewater Treatment System Permit Projections

Table 38 shows the approximate number of new construction authorization permits issued per year by the LHDs from 2002 to 2018. The OSWP has information up through 2018. Information for years after 2018 is still being collected.

Table 38. Approximate Number of On-site Wastewater Treatment System New Construction Authorization Permits Issued

Year       Approximate Number of New Construction Authorization Permits Issued       Change in Number of Construction Authorization Permits Issued         Historical Data       2002       43,529         2003       39,200       -10%         2004       39,901       2%         2005       *       *         2006       39,653       **         2007       33,590       -15%         2008       23,090       -31%         2009       15,897       -31%         2010       14,293       -10%         2011       12,726       -11%         2012       14,018       10%         2013       15,140       8%         2014       14,752       -3%		1	1
Year       Authorization Permits Issued       Authorization Permits Issued         Historical Data       2002       43,529         2003       39,200       -10%         2004       39,901       2%         2005       *       *         2006       39,653       **         2007       33,590       -15%         2008       23,090       -31%         2009       15,897       -31%         2010       14,293       -10%         2011       12,726       -11%         2012       14,018       10%         2013       15,140       8%		Approximate Number of	Change in Number of
Authorization Permits Issued  Historical Data  2002	Year		
Historical Data       2002       43,529         2003       39,200       -10%         2004       39,901       2%         2005       *       *         2006       39,653       **         2007       33,590       -15%         2008       23,090       -31%         2009       15,897       -31%         2010       14,293       -10%         2011       12,726       -11%         2012       14,018       10%         2013       15,140       8%			
2002     43,529       2003     39,200     -10%       2004     39,901     2%       2005     *     *       2006     39,653     **       2007     33,590     -15%       2008     23,090     -31%       2009     15,897     -31%       2010     14,293     -10%       2011     12,726     -11%       2012     14,018     10%       2013     15,140     8%		Issued	Issued
2003     39,200     -10%       2004     39,901     2%       2005     *     *       2006     39,653     **       2007     33,590     -15%       2008     23,090     -31%       2009     15,897     -31%       2010     14,293     -10%       2011     12,726     -11%       2012     14,018     10%       2013     15,140     8%	Historical Data		
2004     39,901     2%       2005     *     *       2006     39,653     **       2007     33,590     -15%       2008     23,090     -31%       2009     15,897     -31%       2010     14,293     -10%       2011     12,726     -11%       2012     14,018     10%       2013     15,140     8%	2002	43,529	
2005       *       *         2006       39,653       **         2007       33,590       -15%         2008       23,090       -31%         2009       15,897       -31%         2010       14,293       -10%         2011       12,726       -11%         2012       14,018       10%         2013       15,140       8%	2003	39,200	-10%
2006     39,653     **       2007     33,590     -15%       2008     23,090     -31%       2009     15,897     -31%       2010     14,293     -10%       2011     12,726     -11%       2012     14,018     10%       2013     15,140     8%	2004	39,901	2%
2007     33,590     -15%       2008     23,090     -31%       2009     15,897     -31%       2010     14,293     -10%       2011     12,726     -11%       2012     14,018     10%       2013     15,140     8%	2005	*	*
2008     23,090     -31%       2009     15,897     -31%       2010     14,293     -10%       2011     12,726     -11%       2012     14,018     10%       2013     15,140     8%	2006	39,653	**
2009     15,897     -31%       2010     14,293     -10%       2011     12,726     -11%       2012     14,018     10%       2013     15,140     8%	2007	33,590	-15%
2010     14,293     -10%       2011     12,726     -11%       2012     14,018     10%       2013     15,140     8%	2008	23,090	-31%
2011     12,726     -11%       2012     14,018     10%       2013     15,140     8%	2009	15,897	-31%
2012     14,018     10%       2013     15,140     8%	2010	14,293	-10%
2013 15,140 8%	2011	12,726	-11%
	2012	14,018	10%
2014 14,752 -3%	2013	15,140	8%
	2014	14,752	-3%
2015 14,939 1%	2015	14,939	1%
2016 16,173 8%	2016	16,173	8%
2017 17,794 10%	2017	17,794	10%
2018 18,367 3%	2018	18,367	3%
Projections	Projections		
2019 17,899 -3%	2019	17,899	-3%
2020 17,368 -3%	2020	17,368	-3%
2021 17,176 -1%	2021	17,176	-1%
2022 17,0686%	2022	17,068	6%
2023 16,871 -1%	2023	16,871	-1%
2024 16,702 -1%	2024	16,702	-1%

<sup>\*</sup>Data collected were a statistical anomaly and not included in this analysis.

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<sup>\*\*</sup>Percent change could not be calculated.

<sup>&</sup>lt;sup>12</sup> NC On-Site Water Protection Branch (2002-2018). "County Monthly Activity Reports." Accessed at http://ehs.ncpublichealth.com/oswp/resources.htm.

The number of permits issued began to level off in 2013 and 2014. The worst effects of the recession appear to be over as the percent change in permits issued is in single digits as compared to double digits in the previous years. Based on the OSWP's estimates, 2015 showed a significant increase in the number of permits issued, and then levels off around 2018 and shows a small downtown through 2024. However, the number of permits issued depends on the current status of the housing market and the economy, so it can vary from year to year.

Figure 1 shows the relationship between the number of new construction authorization permits issued and the total number of housing permits with on-site wastewater treatment systems. The majority of on-site wastewater treatment system permits issued each year are for single family homes.

**New CA Permits Total Housing Permits Estimated Septic Projections** 

Figure 1. New Construction Authorization Permit Projections in the Thousands by Year

Table 39 shows the projected number of new construction authorization permits issued from 2019 to 2024.

Table 39. Projected Number of Permits Issued

Year	Total Number of Permits Issued*
2019	17,899
2020	17,368
2021	17,176
2022	17,068
2023	16,871
2024	16,702

<sup>\*</sup>For a description of how these figures were estimated, see Table 38.

Based on OSWP County On-Site Activity Reports, approximately .5% of all permits issued utilizes advanced pretreatment or drip irrigation. Advanced pretreatment and drip irrigation are more likely to be used on sites with limitations that prohibit the installation of a conventional on-site wastewater treatment system.